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OCCUPATIONS IN THE USSR**

Clifford G. Gaddy

Paper No. 30, November 1991

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by Clifford G. Gaddy

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UNCOVERING THE "HIDDEN WAGE": PUBLIC PERCEPTIONS OF OPPORTUNITIES FOR SIDE INCOME IN VARIOUS OCCUPATIONS IN THE USSR

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1. INTRODUCTION

It is well known that the monetary wage received by wage-earners in the USSR¹ by no means represents the true full compensation for their jobs. There is, in addition to the pecuniary payment, a host of other material benefits, some of which are legal and well-publicized (e.g., enterprise-provided housing, meals on site, take-home food packages), while others are illegal or at best quasi-legal and, for that reason, are less public. Such illegal benefits include opportunities for pilferage or bribes, for shirking, or for engaging in private economic activity in connection with state employment. Although there have been many reports of the existence of this category of benefits, there has been no study of how their "hidden" nature influences economic behavior. The present report is an attempt to begin such an investigation.

An earlier study by this author in the *Berkeley-Duke Occasional Papers on the Second Economy in the USSR* [GADDY 1991] used an equalizing differences (hedonic wage) model to suggest that Soviet workers choose their jobs based on the "bundles" of formal and informal components offered by various jobs. In equilibrium, workers and enterprises are matched according to workers' preferences for various components and enterprises' abilities to provide those components. One of the implicit assumptions of that analysis was that workers have perfect information about the set of possible compensation bundles before making their job choices. In reality, of course, this assumption is a highly tenuous one. Even in Western market economies, there are numerous attributes of a job that are rarely known in advance. Such nonpecuniary attributes of the job as the risk of injury, working conditions, or relations with co-workers are all highly uncertain.

¹ Recent events have, of course, rendered much familiar terminology regarding the former USSR anachronistic. However, since most of the discussion in this paper relates to the pre-1990 situation, I retain use of terms such as "Soviet Union," "Soviet," and "USSR" in their traditional meaning.

And although the pecuniary rewards are usually better known, even there uncertainties will arise with respect to important elements such as the chances of promotion or raises, or the actual results of piece-rate schemes.

In the Soviet Union, to the extent that workers receive wage bundles containing large informal components which are poorly known in advance, the uncertainties associated with a job may be even higher than in the West. All of this suggests that workers' subjective beliefs or perceptions about the "hidden wage" may be of utmost importance in determining their labor market behavior. It is, after all, workers' *perceptions* of what jobs represent which determine their choice of jobs and which drive their search to uncover more of the hidden information about jobs.

This paper will attempt to examine a unique set of data on Soviet citizens' perceptions of one of the major components of the hidden wage, namely the opportunities for additional side income in different occupations. The principal goal of the study is modest: to describe quantitatively what people believe to be the opportunities for side income in various jobs. Along the way, however, several other topics of relevance to the issue of perceptions and labor market behavior will be addressed, including questions such as, "What are the determinants of people's perceptions of side income?" and "How well do people's perceptions of side income accord with reality?" A final section will attempt to use perceptions of side income to draw conclusions about the growth of the Soviet second economy over the past decade.

The rest of this paper is as follows. Section 2 presents the data used for analysis and discusses some of the technical issues that must be resolved before the data can be summarized. Section 3 adjusts the original data on perceptions to compensate for one of these technical problems, sample censoring. Section 4 focuses on the determinants of people's perceptions of side income. Utilizing the findings from Section 4, Section 5 then adjusts the sample respondents' perceptions to provide as accurate as possible a representation of average perceptions in the various regions of the USSR. Section 6 investigates the accuracy of perceptions of side income in two ways: first, by asking whether perceptions of an occupation differ depending on one's direct experience of the job and, second, by comparing respondents' perceptions with the actual behavior they themselves report in other parts of the questionnaire. Section 7 reports on a follow-up survey from the new wave of Soviet emigrants in the late 1980s. Their perceptions of the USSR some eight or nine years after the original survey make it possible to investigate the growth of the second economy during the 1980s.

For convenience, most of the technical details of statistical procedures and so forth have been kept to a minimum in the body of the text. Those issues are discussed more fully in a set of technical notes in Appendix B. Appendix

A is an English translation of the relevant sections of the survey instrument used to obtain the data.

2. THE DATA

As in the two companion papers to this study [GADDY 1991], the data in this paper come from the Berkeley-Duke questionnaire survey of recent emigrants from the USSR to the United States. The section of the survey used here, Part B, asked respondents to report on their perceptions of opportunities for additional income in various occupations in the Soviet Union.² In brief, the questions in Part B asked respondents to state estimated side income for the following categories of workers and employees:³

- (a) "All workers in your branch [sector of the economy]"
- (b) "All workers in your occupation [profession] in your branch"
- (c) "All workers in your position in your branch"
- (d) "All workers in ..." (followed by a list of 36 occupations).
- (e) "Any other occupations you think offer good opportunities for side earnings."⁴

For each of these questions, however, respondents did not themselves specify an exact ruble figure. Rather, they could only check one of eight boxes,

² See GADDY 1991, pp. 15-16, for a general description of the Berkeley-Duke survey. The entire survey consisted of four parts. In addition to Part B, dealt with in this paper, the three other parts were: C, on individuals' expenditures and wealth; D, on family income; and E, on individuals' labor supply and earnings. Parts C, D, and E inquired solely about respondents' own behavior. Part B is thus unique in inquiring about respondents' beliefs or perceptions about other people's behavior. Note also that in contrast to Parts C, D, and E, which asked people to respond to circumstances in their "last normal year" before the decision to emigrate changed their economic behavior, the information in Part B relates to the period shortly before departure from the USSR. There was on average nearly a two-year difference between the last normal year and the year of departure. The mean year of departure — and thus the year to which the perceptions of side income in this study relate — was 1979.

Part B was administered to all survey participants age 16 and older. The present study is restricted to those individuals who themselves participated in the labor force. This sample selection rule reduced the total number of 2,072 responding to Part B to a sample size of 1,861. Means of the variables used in this study may be found in note 5 of Appendix B.

³ See Appendix A for an English translation of the exact wording of these questions, and in particular, for the list of 36 occupations in (d) below.

⁴ The present study focuses on the data from the questions described in points (a), (b), and (d). The data from (c) are not dealt with at all. The information obtained from (e), although potentially of great interest, involved such specific technical problems that it was decided to relegate the entire discussion of this point to an appendix. See note 7 in Appendix B.

each representing an income range. The income ranges and corresponding interval numbers were as follows:

Interval number	1	2	3	4	5	6	7	8
Rubles/month	0	1-10	11-25	26-50	51-100	101-200	201-300	Over 300

This survey design — specifically, the use of an open-ended uppermost interval ("Over 300 rubles/month") — gives rise to a serious statistical problem known as sample censoring. A look at some of the data will illustrate this issue. As described above, respondents were presented in one of the sections of Part B with a list of 36 occupations in the Soviet economy and asked to state how much they believed an individual working in that occupation would on average earn, per month, in side income. The responses to this list of 36 occupations provide a rich set of information since all 1,861 members of the sample, with very different backgrounds, were responding to exactly the same questions. (Later we will turn to other questions, in which the respondents comment on their own occupations.) Graphically, a typical distribution of responses might appear as shown below in Fig. 1, the distribution of perceptions of side earnings for nurses (occupation 17).

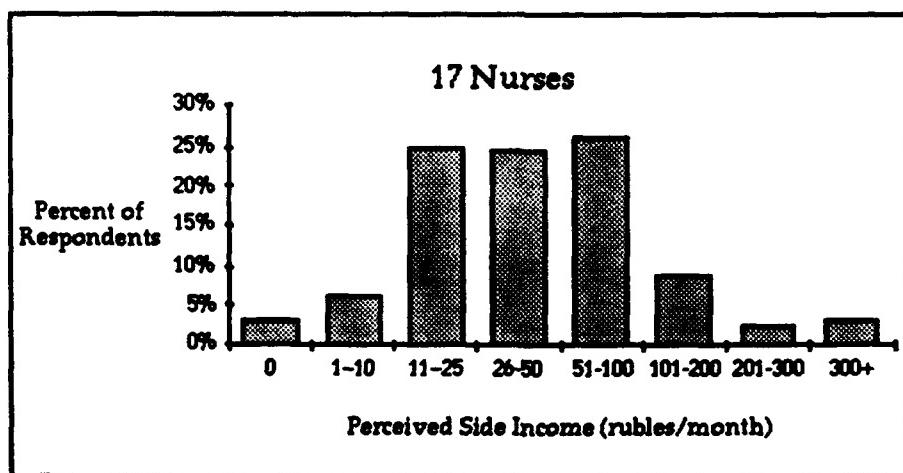


Fig. 1. — Distribution of the Entire Sample's (N=1,861) Perceptions of Nurses' Side Income.

This histogram is strongly suggestive of a normal distribution, and, in fact, we find a similar bell-shape for the distribution of responses for many of the other occupations as well. However, there are also some occupations that exhibit a different picture, such as the histogram shown below in Fig. 2 for another medical profession — surgeons.

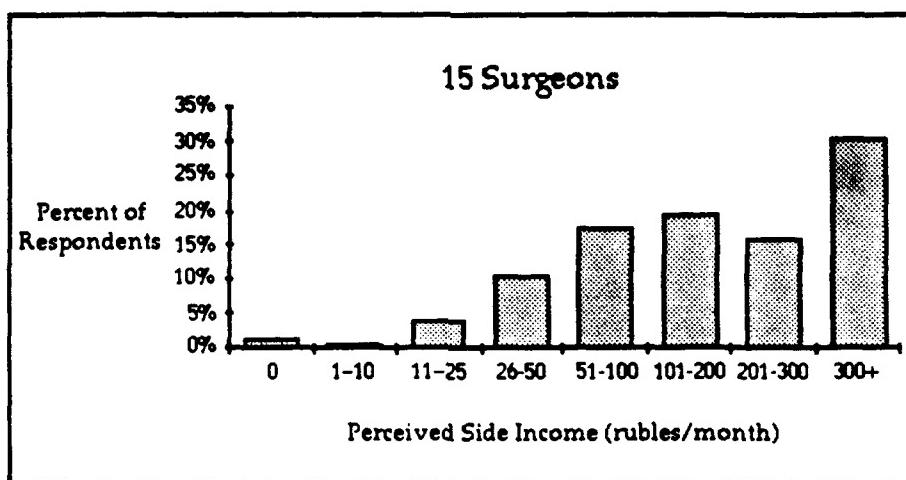


Fig 2. — Distribution of the Entire Sample's (N=1,861) Perceptions of Surgeons' Side Income.

Fig. 2 clearly illustrates the previously mentioned problem caused by an open-ended upper interval. As the figure shows, there are a large number of people who believe that the average surgeon makes more than 300 rubles/month in side earnings, but because of the open-ended interval, we do not know how the answers within that uppermost range are distributed. From the general shape of the rest of the distribution, it is not unreasonable to assume that the "true" distribution of responses for surgeons would continue on out to the right, perhaps providing a symmetric upper tail to the distribution. In other words, we might assume that the underlying distribution for surgeons is approximately normal, as appears to be the case for nurses. This problem of lost information about the tail of a distribution, known as sample censoring, is described in note 1 in Appendix B. The extent to which sample censoring is a problem for other occupations as well can be seen in Table 1, which presents summary statistics for the distribution of responses for all 36 occupations. The statistics include the mean, median, mode, and standard deviation, as well as the percentage of respondents who declined to answer the question (missing values). The figures in column (5) are those that are relevant for

Table 1. Summary Statistics for the Distribution of Soviet Citizens' Perceptions of Average Side Income in 36 Occupations (N=1,861).

Occupation	(1)	(2)	(3)	(4)	(5)	(6)
	Mean	Median	Mode	Std. dev.	% 300+	% missing
1 Retail trade, workers	5.58	6	5	1.44	16.1	2.2
2 Retail trade, managers	7.20	8	8	1.00	54.2	1.6
3 Public dining, workers	5.59	6	6	1.51	15.8	1.8
4 Public dining, managers	7.22	8	8	1.00	55.2	1.6
5 State supply, workers	5.48	5-6	5	1.71	18.2	7.1
6 State supply, managers	7.15	8	8	1.03	52.1	4.6
7 Construction, workers	3.96	4	3	1.62	5.7	4.9
8 Construction, managers	4.73	5	8	2.22	20.9	5.0
9 Local industry, workers	3.79	4	3	1.78	4.0	7.1
10 Local industry, managers	6.16	7	8	1.88	38.0	5.6
11 Heavy industry, workers	2.29	2	1	1.46	0.9	4.4
12 Minor employees	1.95	1	1	1.62	1.8	2.0
13 District physicians	3.95	4	4	2.08	14.4	1.4
14 Hospital physicians	4.82	5	4	1.86	15.7	2.4
15 Surgeons	6.07	6	8	1.62	30.6	1.9
16 Dentists and dental technicians	6.85	7	8	1.26	46.8	1.3
17 Nurses	4.10	4	5	1.39	3.1	1.2
18 Hospital attendants	3.57	4	3	1.34	1.5	1.0
19 Pharmacists	3.99	4	3	2.03	10.4	3.4
20 Elementary school teachers	2.42	2	1	1.40	0.3	2.9
21 HS math. and physics teachers	3.45	4	4	1.74	2.3	4.8
22 University mathematics instructors	4.92	5	5	1.96	16.1	7.7
23 Librarians	1.54	1	1	1.10	0.2	3.0
24 Mid-level scientists	1.78	1	1	1.50	1.1	5.0
25 Social security employees	3.54	3	1	2.36	14.3	5.1
26 Truck drivers	6.02	6	8	1.50	25.0	2.8
27 Taxi drivers	6.23	6	8	1.39	28.8	1.1
28 State car drivers	5.19	5	5	1.62	16.6	2.7
29 Plumbers	4.63	5	5	1.47	8.1	0.8
30 Watchmen	3.09	3	1	1.85	4.7	3.3
31 Janitors	2.09	2	1	1.20	0.4	2.7
32 Elevator operators	2.03	1	1	1.66	2.4	3.8
33 Receivers of empty bottles	5.89	6	8	1.96	30.7	1.7
34 Receivers of scrap metal	6.25	7	8	1.84	36.4	1.9
35 Funeral workers	6.10	6	8	1.60	27.3	2.8
36 Funeral management	7.12	8	8	1.19	55.4	3.9

NOTE. — Perceptions were given on a scale of 1-8. See text for details. Columns (1), (2), (3), (4), and (5) are computed on non-missing responses. Column (6) is the percentage of survey respondents who left the question blank.

the issue of sample censoring — the percentage of responses in the uppermost ("Over 300") category.⁵

As Table 1 shows, the case of surgeons is by no means unique. In fact, in 12 of the 36 occupations listed, over 25% of all responses were censored. The rate of censored responses varies from virtually zero (i.e., cases where almost no one gave a category 8 estimate) to over 50%. In the next section of this chapter, we will apply techniques to correct for sample censoring. First, however, let us note several other features of the data which stand out from Table 1.

- (1) The range of mean and median responses across occupations (see columns 1 and 2) is large. In other words, people do discriminate in their assessments. While there are four occupations for which the median assessment is category 8 (i.e., half or more of all respondents think people in these occupations make more than 300 rubles a month in side earnings), there are also four occupations with a median of 1 (i.e., half of the respondents think those occupations make nothing at all).
- (2) The overall rate of response (see column 6) was high — nearly 97% on average. If we assume that failure to give an answer is due to lack of information, this suggests that the public at large feels they have some idea of what the level of expected side income is across all of the occupations.⁶
- (3) While on the whole the level of non-response is low, there is enough variation in response rates across occupations to make some general observations about the patterns. The lowest level of non-response was obtained when individuals were asked to estimate side earnings for plumbers (0.8%), followed by taxi drivers (1.0%) and several of the medical professions. The highest rates of non-response were for university mathematics instructors (7.7%) and workers in state supply and in local industry (7.1% each). These patterns are consistent with the notion that people are most likely to withhold an answer for an occupation with which they rarely or ever come into personal contact. Plumbers, taxi drivers, and medical professionals are occupations which serve most people in the Soviet Union. Relatively few people, on the other hand, could claim to have known or come into contact with a mathematics professor. It is similarly interesting to note that while there is a high rate of non-response

⁵ Table 1 lists values on the 1-8 scale. Later, for ease of interpretation, these values will be translated into their ruble equivalents. For now, however, we are interested in the statistical properties of the distribution of responses.

⁶ It should be noted that subjects were not given an explicit "don't know" option; still, throughout the questionnaire the possibility of non-response was allowed.

for workers in state supply and local industry — sectors with which the general public has little contact — the much more public sectors of retail trade and public dining show very low rates of non-response.

There does not, by the way, appear to be any correlation between the rate of missing answers for an occupation and the mean level of responses: that is, people seem to be no more (or less) likely to venture an estimate of side income for a "high-earning" occupation than one generally perceived to have modest side earnings opportunities.⁷

3. CORRECTION FOR SAMPLE CENSORING

The previous section identified the problem of sample censoring in the data. Fortunately, statistical techniques have been developed to correct for this problem. Note 1 in Appendix B describes how the properties of the censored normal distribution can be used to obtain the sample moments of the corresponding uncensored distribution. Applying these techniques to the data on perceptions of side earnings in the list of 36 occupations, we can obtain means and standard deviations corrected for censoring.

These new ("true") means and standard deviations are presented in Table 2 (cols. 1 and 2), where they are compared with the means and standard deviations of the original (censored) distributions (cols. 3 and 4).⁸ Predictably, in the cases with few censored responses, the correction has little effect — the means and standard deviations are virtually the same. But in other cases, correcting for censoring of the sample makes a substantial difference, with upward revisions of the mean of as much as 33%. The overall result of the correction is to widen the gap between occupations. As Table 2 shows, perceived side incomes range from a high of around 350 rubles/month (for four types of managers) to negligible amounts such as 8 rubles/month for librarians or 13 rubles/month for janitors.

⁷ In addition to the non-response rate, the other, more obvious measure of uncertainty is the variance of responses. The true variances of the distributions are not evident from Table 1, however, since the fact that the sample is censored distorts the variance as well as the mean.

⁸ Beginning with Table 1 all data will be presented in ruble values. The procedure used to convert the intervals 1-8 to ruble values is described in note 2 in Appendix B.

Table 2. Effects of Censoring of Data: Soviet Citizens' Perceptions of Side Income in 36 Occupations (N=1,861).

Occupation	(1) Mean of uncensored sample	(2) (Standard) (deviation)	(3) Mean of censored sample	(4) (Standard) (deviation)	(5) Percent increase of (1) over (3)
1 Retail trade, workers	154.84	(135.19)	145.42	(115.33)	6.5%
2 Retail trade, managers	356.68	(188.14)	278.58	(100.85)	28.0%
3 Public dining, workers	156.81	(135.25)	147.70	(116.27)	6.2%
4 Public dining, managers	356.92	(189.09)	278.13	(100.94)	28.3%
5 State supply, workers	158.55	(143.32)	147.47	(121.00)	7.5%
6 State supply, managers	343.07	(177.87)	275.11	(98.93)	24.7%
7 Construction, workers	68.85	(93.62)	65.54	(89.06)	1.9%
8 Construction, managers	137.00	(155.66)	124.39	(129.77)	10.1%
9 Local industry, workers	61.82	(85.77)	61.05	(82.90)	1.6%
10 Local industry, managers	248.60	(194.92)	205.90	(133.69)	20.7%
11 Heavy industry, workers	20.10	(43.17)	20.07	(42.94)	0.1%
12 Minor employees	21.53	(60.10)	21.39	(59.28)	0.7%
13 District physicians	87.95	(130.44)	82.32	(115.81)	6.8%
14 Hospital physicians	120.74	(135.13)	113.39	(118.12)	6.5%
15 Surgeons	217.76	(170.16)	191.14	(127.51)	13.9%
16 Dentists and dental technicians	309.94	(188.35)	251.15	(114.97)	23.4%
17 Nurses	60.63	(69.47)	60.27	(67.84)	0.6%
18 Hospital attendants	42.47	(55.41)	42.36	(54.77)	0.3%
19 Pharmacists	85.04	(118.85)	81.52	(109.13)	4.3%
20 Elementary school teachers	19.57	(38.58)	19.56	(38.46)	0.1%
21 HS math. and physics teachers	48.93	(70.20)	48.66	(68.95)	0.6%
22 University math. instructors	128.34	(134.75)	120.76	(117.52)	6.3%
23 Librarians	8.06	(26.34)	8.05	(26.31)	0.1%
24 Mid-level scientists	16.80	(51.65)	16.72	(51.15)	0.5%
25 Social security employees	83.31	(133.66)	77.74	(119.31)	7.2%
26 Truck drivers	201.64	(151.64)	183.42	(119.82)	9.9%
27 Taxi drivers	220.08	(156.65)	197.43	(119.52)	11.5%
28 State car drivers	133.52	(132.90)	125.74	(115.28)	6.2%
29 Plumbers	93.83	(100.55)	91.75	(94.19)	2.3%
30 Watchmen	45.95	(85.37)	45.06	(81.81)	2.0%
31 Janitors	13.24	(29.47)	13.23	(29.39)	0.1%
32 Elevator operators	25.28	(67.88)	25.05	(66.68)	0.9%
33 Receivers of empty bottles	221.42	(182.88)	190.34	(134.92)	16.3%
34 Receivers of scrap metal	256.83	(191.95)	214.07	(132.03)	20.0%
35 Funeral workers	213.10	(163.34)	189.71	(124.92)	12.3%
36 Funeral management	364.08	(208.65)	273.63	(109.24)	33.1%

Note. — Cols. (1) and (2) obtained by univariate tobit regression, with category "8" responses treated as censored. Cols. (3) and (4) are the simple means and standard deviations of the data, with category "8" responses set equal to 362.5 rubles/month (the midpoint of an imaginary closed-ended interval of 301–425 rubles/month — see note 2 in Appendix B).

To put the sum of 350 rubles/month into the context of the Soviet labor market, note that in 1979 the average *official* monthly wage in the USSR was 163 rubles.⁹ Only around 5% of all employed persons earned more than 300 rubles a month in official pay.¹⁰ Of the numerous observations that could be made on the basis of Table 2, let us pick just one: the difference between perceptions of managers' side income and that of ordinary workers. How, for instance, does the manager-worker differential in official pay compare with the corresponding differential in (perceived) side incomes? It is well known that the gap in official salaries between managers and workers is much less in Soviet industry than in, say, U.S. industry. Does this also apply to the *unofficial* wages — side incomes? The Soviet economist Sergey BELANOVSKIY [1988, p. 99] finds that the average ratio of top managers' official salaries to production workers' wages in the same plant is 2.11.¹¹ Occupations 1–10 in the list of 36 in the Berkeley-Duke survey consist of five sets of manager-worker pairs. In the first four of these pairs (retail trade, public dining, state supply, and construction), the manager/worker side income ratios range from 1.99 to 2.30 and are thus very close to Belanovskiy's ratio of official wages, while in the fifth (local industry), the ratio of side incomes is significantly higher, at 4.02.

4. DETERMINANTS OF PERCEPTIONS

The preceding section corrected the data for sample censoring. However, a further statistical complication arises from the fact that the individuals to whom the Berkeley-Duke emigre questionnaire was administered are not a random sample of

⁹ The figure of 163 rubles/month is for the urban and rural population, while the Berkeley-Duke sample is composed exclusively of urban residents. Average urban wages are somewhat (about 5–8%) higher than rural wages. Unfortunately, Soviet sources provide no statistics on official wages for most occupations listed here. For reference, Table B.1 in note 3 of Appendix B shows the average official earnings by industry.

¹⁰ In April 1976, 3.4% of full-time workers and employees made over 300 rubles a month. By March 1981 that figure had risen to 6.1% (*Trud v SSSR*, p. 146).

¹¹ There is some ambiguity in the English term "manager" and the various Soviet equivalents. Note from the actual questionnaire (Appendix A) that people were asked about perceptions of side income for "materially responsible persons and management" [*nachal'stvo*]. The Soviet term for managerial personnel in general is *rukovoditeli*, which includes such sub-categories (in descending rank) as "directors" [*direktori*], "heads of (factory) shops" [*nachal'niki tsekhov*], "heads of sections and shifts" [*nachal'niki uchastkov i smen*], and "foremen" [*mastersa*]. Belanovskiy's ratio of 2.11 was for salaries of the top category of "directors" in relation to workers' pay.

the Soviet population. To accurately reflect the attitudes of the parent population (the urban population of the USSR in the late 1970s), it is likely that results obtained from this non-representative sample will have to be adjusted.¹² This, however, begs the question of what to adjust for. In other words, we must look at the determinants of perceptions. Since we know a great deal about the individuals who offered their perceptions in this part of the survey, we can control for some of their personal characteristics that might have influenced their answers. We know, for instance, whether they were male or female, and we know their ages, educational levels, cities of residence, occupations, earnings (both official and unofficial), and more. Therefore, one straightforward way to investigate the determinants of perceptions is to regress each individual's perception of side earnings for an occupation against a vector of personal and other characteristics which one might suspect will influence their perceptions.

The regressions in question were tobit regressions (again, to correct for sample censoring) on the 36 listed occupations to study how perceived side earnings were affected by the following characteristics of each respondent:

1. sex
2. broad occupational type: clerical, professional, managerial, or operative ("blue collar")
3. age
4. education
5. region/nationality
6. official wage
7. unofficial income (income earned from private activity plus theft/bribes).¹³

¹² There is also another type of measurement error, one which stems from the requirement that respondents only indicate an income range rather than a specific ruble figure. See note 4 in Appendix B for a discussion.

¹³ Age and education were entered as both linear and quadratic terms. The regression equations were thus of the form

$$\ln (\text{PERCEIVED SIDE INCOME}_{ji}) = a_1 + a_2 \text{SEX}_i + \\ a_3 \text{OCCUPATIONAL TYPE}_i + a_4 \text{AGE}_i + a_5 \text{AGE}_i^2 + \\ a_6 \text{EDUCATION}_i + a_7 \text{EDUCATION}_i^2 + a_8 \text{REGION}_i + \\ a_9 \text{OFFICIAL WAGE}_i + a_{10} \text{UNOFFICIAL INCOME}_i,$$

where i indexes individuals and j ($= 1, \dots, 36$) indexes occupations. The equations were run separately for each occupation.

The definitions of variables follow those used in my previous related studies [GADDY 1991] — see especially pp. 16–18. Table B.2 in Appendix B shows the means by region. The equation above can be thought of as a reduced form of a model of perception of side earnings. For discussion of what a behavioral model might look like, see note 6 in Appendix B.

The coefficient estimates obtained from these regressions will later allow us to correct for the non-random nature of the sample. But the regressions are also valuable in their own right to indicate which factors influence perceptions. The 36 regressions produced $36 \times 13 = 468$ coefficient estimates. Rather than attempt to present all the estimates and their standard errors or t-statistics, Table 3 below summarizes the results.

Table 3. Determinants of Perceptions of Side Income for 36 Occupations.

Coefficients	Number of cases (of 36) at various significance levels*:			
	Insignificant	Moderately Significant	Highly Significant	Very Highly Significant
Sex	28	8	0	0
Occupational type	36	0	0	0
Age	12	11	9	4
Education	15	15	3	3
Armenian residence	0	0	0	36
Southern USSR residence	7	2	3	24
Moscow-Leningrad residence	16	6	8	6
First economy income	26	8	2	0
Second economy income	4	6	6	20

SOURCE: Results of 36 tobit regressions with $\ln(\text{PERCEIVED SIDE INCOME}_j)$.

$j = 1, \dots, 36$, as the dependent variable.

* Definition of significance levels:

"Insignificant" = Not significant at the .10 level, two-tailed test

"Moderately Significant" = Significant at the .10 level, two-tailed test

"Highly Significant" = Significant at the .01 level, two-tailed test

"Very Highly Significant" = Significant at the .0001 level, two-tailed test

The results shown in Table 3 reflect several interesting points.

- (1) The SEX variable is almost completely insignificant, implying that men's and women's perceptions are indistinguishable. This is a rather startling result since the author's earlier research [GADDY 1991] has shown that men and women have very different direct personal experience of the second economy: their participation rates differ, they supply different numbers of hours, and they have different earnings levels. This finding that despite different direct experience, perceptions are the same, is strong evidence of sharing of knowledge about the second economy in Soviet society, at least within households.¹⁴ (It is also interesting to note that in the eight cases that

¹⁴ The key here, of course, is that we are, for the most part, examining the effect of gender on married men and women. In most cases, both spouses of a household were interviewed in the

were marginally significant, the SEX dummy has a negative coefficient — i.e., men's perceptions of side income are lower than women's.)

- (2) OCCUPATIONAL TYPE is *never* a determining factor for estimates. This is particularly interesting since there are a few cases in which respondents were asked specifically about the difference between perceived side earnings for managers and ordinary workers in the same industry (occupations 1 and 2: retail trade; 3 and 4: public dining; 5 and 6: materials and supply; 7 and 8: construction; and 9 and 10: local industry). Neither here nor anywhere else do respondents who themselves are managers give answers different from anyone else. Since it is clearly a consensus that managers do make more illegal income than ordinary employees, there does not seem to be any private information here. Managers make more illegally, and everyone knows it.

Another example is occupation 12 (minor employees [*melkiye sluzhashchiye*]). Respondents who themselves work in clerical occupations perceive illegal income of minor employees (who are mainly clerical) no differently than anyone else. It should be kept in mind, however, that these are very broad occupational types. We will later look at how individuals in *specific* occupations perceive side income in their own occupations.

- (3) AGE is a fairly significant factor in determining perceptions of side income. Thirteen of 36 occupations show a 1% level of significance or better. The effect of age is U-shaped, and is least at around the population mean (40–44 years), becoming stronger on either side of that. This is interesting since the 40–44 year olds are the prime working age, those who presumably have the best information. In the cases where age does have an effect, the difference can be quite large. In estimating side income for hospital physicians (occupation 14), for instance, a 60-year old and a 25-year will both give on average an estimate some 40% higher than a 40-year old. As in all cross-sectional studies of this type, however, it is impossible to distinguish a pure age effect from a cohort effect.¹⁵

survey, and apparently the interviews with each individual were conducted in front of the other adult members of the household. To the extent that the responses of husbands and wives thus mutually influenced one another, this might be described as a "household interview effect." However, this does not necessarily invalidate the conclusion above about the unimportance of the respondent's sex. The question is, does more information sharing and mutual influence take place during the course of the interview than in "everyday life"?

¹⁵ A "pure age" effect in this context might represent the effect of more experience in the labor market, more opportunities to sample more jobs directly and indirectly, and hence more information about occupations. A "cohort" effect, on the other hand, might reflect different patterns

- (4) EDUCATION is moderately significant, and its effect, too, is U-shaped. Often AGE and EDUCATION are substitutes: if one is significant, the other is not.
- (5) NATIONALITY/REGION is an extremely important factor. The dummy for ARMENIA ("Armenians from Armenia") is always the single most significant variable, and its effect is by far the largest of any other. All 36 regressions show Armenia to be significant to the .01% level, and the value of the coefficient is always positive.

The dummy for SOUTH is also very significant and large: in 24 of 36 regressions the coefficients are significant at the .01% level. The only exceptions are the occupations such as minor employees, heavy industry workers, librarians, which have the lowest values (and low variance) for perceived side earnings. In the cases where both the ARMENIA and SOUTH dummies are significant at this level, SOUTH has an effect equal to about 0.3–0.5 of ARMENIA .

MOSCOW/LENINGRAD is significant at the highest level in six cases: managers and employees in retail trade, public dining, and state supply. In other words, the highest estimates by metropolitan residents only apply to a few specific occupations. Otherwise, they do not differ from the rest of the North, but are clearly less than the southern republics.¹⁶

- (6) FIRST ECONOMY EARNINGS are generally insignificant as an explanatory factor for people's perceptions. In the relatively few cases where the coefficient on this variable is significant, the sign is positive.
- (7) SECOND ECONOMY EARNINGS are highly significant (at the .01% level) in 20 of the 36 cases and always with a positive sign. The effect varies somewhat across occupations, but roughly it appears that each additional

of second economy activity, and hence different information or even a different perception function (see note 6 in Appendix B), in different generations.

¹⁶ The importance of region is so strong that there was the possibility that it might be swamping all other effects. To check the differential impact of the other variables across regions, I ran tobit regressions on all 36 occupations separately by region (making a total of 144 regressions), removing the regional dummies, of course, but otherwise using the same regressors as above. Sex, occupational type, and first economy income remained insignificant. Age and education were moderately significant in several cases, as before, although not always for the same occupations as in the first set of regressions. The results of the separate regressions by region did not seem to warrant pursuing that approach.

100 rubles/month in second economy earnings which a person has raises his or her estimate of side income in other occupations by about 5%. Exactly why there is this effect is not clear, however. If high second economy earnings reflect more direct experience of side income in different occupations, then it would suggest more information about the true mean — i.e., a more reliable estimate. However, it might also be argued that those persons who have higher second economy earnings are susceptible to biased information — they only observe the more "successful" tail of the distribution of side incomes — and consequently their estimates are less reliable.

5. ADJUSTED PERCEPTIONS

The results of regressions summarized in Table 3 suggest that actually very few of the suggested demographic or economic variables are consistently important for determining perceptions. Sex, occupational type, and level of earnings in the official sector are almost totally irrelevant to one's perceptions of side income opportunities in various occupations. Age and education are marginal factors. Second economy earnings clearly have a strong influence, while the region in which the respondent resides is extremely important. This implies that the proper procedure might be simply to divide the sample into four subgroups by region and find the tobit (uncensored) means while controlling for second economy income and (possibly) for age and education. The coefficient estimates could then be used to produce conditional means based on specific values of the independent variables. The main problem with this approach is that it is unclear what level of second economy earnings should be chosen as the standard. As mentioned earlier, the interpretation of this variable is unclear. Having more second economy income oneself tends to raise a person's estimate of side income for occupations. But does this effect of second economy income reflect increased knowledge or merely a special kind of bias? With no way to resolve this problem, it was decided to ignore all other distinctions in the sample except for region, and hence find the uncensored means by region without any other controls. This approach basically assumes that although the Berkeley-Duke sample differs from the parent population in several respects, none of these differences — except region — matter. These means by region are shown in Table 4.

Some of the observations that can be made from Table 4 are the following:

- (1) As predicted by the strength of the coefficients on regions in earlier regressions, estimates of side income in Armenia are much higher than in the

other regions. In general, the perceived earnings for any given occupation decline from left to right across the table: Armenia, South, Moscow/Leningrad, and North.¹⁷

- (2) For some occupations, however, there is not a gradual decline from left to right, but rather a sharp drop from Armenia to the rest. For instance, in occupations 7 (construction workers), 12 (minor employees), 13 (district physicians), 22 (university mathematics instructors), and 25 (social security employees), even the rest of the South is far below Armenia.
- (3) Armenia appears to have an entirely different lower threshold for side income in jobs, one which is an order of magnitude higher than the rest of the country. This suggests that the second economy is truly all-encompassing in that region, with a climate of "everybody makes something on the side." Even a librarian, who in the rest of the Soviet Union has essentially no side income at all, can be expected to make about 29 rubles/month in Armenia. And although this pales in comparison with other occupations in Armenia, it still amounts to a "wage supplement" of 30% of a librarian's official pay!¹⁸

¹⁷ Note that official wages do not differ appreciably between Armenia and the rest of the USSR. For instance, in 1980 the average of all urban wages in Armenia was 93% of the average wage in the RSFSR, and it is likely that most of that difference is attributable to greater employment in lower-paying branches in Armenia. The average urban wage in the other southern republics was roughly 85-90% of that in the RSFSR (*Trud v SSSR*, pp. 156-157).

¹⁸ Assuming librarians make the average of workers in "Culture" (and they probably made less), the official salary of a librarian in Armenia in 1980 would have been around 98 rubles a month, while a librarian in the RSFSR made 116 rubles [*Trud v SSSR*, pp. 159 and 183].

Table 4. Average Monthly Side Incomes (in Rubles) for 36 Occupations as Perceived by the General Population, By Region.

Occupation	Region			
	Armenia (N=352)	South (N=243)	Moscow- Leningrad (N=560)	North (N=706)
1 Retail trade, workers	327.71	203.93	130.64	85.36
2 Retail trade, managers	615.44	575.68	329.18	256.83
3 Public dining, workers	308.56	194.69	138.13	93.04
4 Public dining, managers	654.31	461.99	328.75	268.14
5 State supply, workers	310.03	139.21	147.35	108.99
6 State supply, managers	586.99	438.74	312.98	269.48
7 Construction, workers	200.87	53.63	36.06	38.07
8 Construction, managers	544.49	114.68	57.47	76.29
9 Local industry, workers	137.08	61.86	52.11	30.00
10 Local industry, managers	495.04	403.74	181.64	164.86
11 Heavy industry, workers	40.01	15.14	16.46	14.32
12 Minor employees	87.31	8.01	5.92	5.80
13 District physicians	379.11	91.89	26.21	32.27
14 Hospital physicians	395.85	146.89	62.20	64.10
15 Surgeons	569.84	254.37	161.81	146.34
16 Dentists and dental technicians	559.95	475.02	253.78	232.82
17 Nurses	127.94	80.93	43.37	34.74
18 Hospital attendants	84.34	52.00	35.38	24.07
19 Pharmacists	279.01	118.01	36.71	24.30
20 Elementary school teachers	54.77	24.28	9.92	8.11
21 High school math. and physics teachers	69.83	64.54	38.20	42.33
22 University mathematics instructors	348.72	111.70	86.27	79.94
23 Librarians	28.63	3.98	3.44	2.46
24 Mid-level scientists	65.95	6.99	4.11	4.56
25 Social security employees	360.63	60.32	26.26	21.14
26 Truck drivers	379.88	255.30	171.37	134.01
27 Taxi drivers	546.79	247.90	181.93	150.33
28 State car drivers	358.97	179.69	88.73	65.05
29 Plumbers	217.35	98.10	67.77	59.12
30 Watchmen	161.09	40.13	13.66	20.00
31 Janitors	26.63	13.22	10.15	8.74
32 Elevator operators	109.25	9.82	6.48	2.66
33 Receivers of empty bottles	285.73	377.74	215.16	158.88
34 Receivers of scrap metal	294.73	397.92	259.11	201.65
35 Funeral workers	328.09	229.37	239.20	137.56
36 Funeral management	661.05	381.69	411.54	243.08

SOURCE: Tobit regressions of $\ln(\text{PERCEIVED SIDE INCOME}_j)$, $j = 1, \dots, 36$, without controls (univariate tobit) for all 36 occupations, separately by region.

6. TESTING THE ACCURACY OF PERCEPTIONS

Having now adjusted the perceptions of side incomes in the Soviet economy obtained from the Berkeley-Duke survey, we can address the issue of the accuracy or reliability of these perceptions. In the next two sub-sections of this paper, the perceptions will be tested in two ways: (1) by asking whether perceptions of an occupation differ depending on one's direct experience of the job, and (2) by comparing respondents' perceptions with the actual behavior they themselves report in other parts of the questionnaire.

6.1. THE 36 OCCUPATIONS

Although the previous sections were devoted to an investigation of the various determinants of people's perceptions of side income in the Soviet economy, so far we have not examined what might be suspected of being the most important determinant of all, namely direct experience of a job. To take a concrete example: while we have estimates of what Soviet citizens in general think a nurse makes in side income, we have not taken into account the fact that among the 1,861 survey respondents there are 34 nurses. The existence of this sample of nurses makes it possible to make two types of comparisons.

- (i) A comparison of the 34 nurses' perceptions of average side income of nurses with the general public's (i.e., the $1,861 - 34 = 1,827$ other respondents') perceptions of what nurses make.
- (ii) A comparison of what the 34 nurses perceive as average side income for nurses with what those same 34 nurses themselves report about their own second economy activity, which includes earnings in second economy jobs and income from theft and bribes (i.e., what our 34 nurses actually report themselves as making in side income)

Both of these comparisons relate to important issues about the Soviet second economy. The first bears upon the interplay between perceptions of side income and labor market behavior. For instance, does direct experience of a job change one's perception of the informal gains to that job and, if so, how? The second type of comparison can help answer the question of whether people's

perceptions of what is happening outside of their own direct experience is a reliable source of information about the second economy.

Although the Berkeley-Duke survey unfortunately does not contain a large enough number of representatives of all the 36 listed occupations to make the kind of comparisons suggested above for nurses, there are sample sizes of a dozen or more for 12 occupations on the list. These are presented in Table 5.

The left side (A) of Table 5 compares perceptions of the sample at large with occupation representatives. The right side (B) presents the actual side income of the occupation representatives.¹⁹

As Part A shows, in most cases there is close agreement between the perceptions of the public at large and the occupation representatives. This is particularly true of retail trade workers, industrial workers, nurses, elementary school teachers, and taxi drivers. Perceptions of truck drivers' side income are also fairly close. While the estimates for the two occupations with the lowest figures — librarians and scientists — are not very close in proportional terms, they are not far off in terms of rubles. The one glaring exception in the list is university mathematics instructors: university teachers themselves give much higher estimates than the public at large. Here, however, it should be kept in mind that what are listed here as "representatives of the occupation" are university faculty in general and not necessarily mathematics instructors. Hence what we are comparing is what university faculty in general think math professors make as opposed to what people at large think they make.

¹⁹ To adjust for the fact that the sample representatives of an occupation may differ in some important respects from the sample as a whole, I adjusted the overall sample perceptions to make them the same in terms of age, educational level, region, and second economy income as the occupation's representatives. The procedure can be illustrated by a concrete example. The 34 nurses in the sample were on average 40.3 years old, with 10.1 years of education and 66 rubles/month in second economy income. Their regional distribution was: 18% Armenian, 18% from the South, 8% from Moscow/Leningrad, and 55% from the North. The remaining 1,827 sample members (the non-nurses), on the other hand, were 42.2 years old, with 11.8 years of education, and made 85 rubles/month in second economy income. They were distributed by regions as follows: 18% Armenian, 13% from the South, 34% from Moscow/Leningrad, and 34% from the North. Since we have established in Section 4 that these factors of region, age, education, and second economy earnings have an important influence on perceptions, this has to be taken into consideration when comparing the two groups — nurses and non-nurses. I chose to adjust the non-nurse group to correspond to the nurses by running on this group the same kind of tobit regression as described in Section 4, obtaining the coefficient estimates and using them to construct conditional means based on the means of the nurse sample.

Table 5. Perceived and Actual Monthly Side Income for 12 Occupations:
As Perceived by Representatives of the Occupations Themselves, as
Perceived by the Rest of the Sample, and as Actually Earned by
Representatives of the Occupation.
(All figures except for column (1) in rubles/month).

Occupation	A. Perceived side income:			B. Actual side income in occupation:			
	No. in sample (1)	By reps. of occ. (2)	By rest of sample (3)	All side income (4)	Private job earnings (5)	Theft/ bribes (6)	Official earnings (7)
1 Retail trade, workers	31	145.50	162.67	153.41	33.33	120.08	96.16
11 Heavy ind., workers	124	15.85	17.75	67.43	53.34	14.09	190.69
13 District physicians ^a		89.07	60.25	118.47	65.85	52.62	174.43
14 Hospital physicians ^a	54	135.34	93.39	118.47	65.85	52.62	174.43
15 Surgeons ^a		244.96	189.51	118.47	65.85	52.62	174.43
17 Nurses	34	52.21	57.31	65.89	41.28	24.61	94.06
20 Elem. school teachers ^b	159	14.14	17.68	67.49	57.50	9.99	135.54
22 Univ. math instructors ^c	21	383.06	179.72	264.76	190.95	73.81	219.00
23 Librarians	22	1.25	4.00	1.59	0.00	1.59	88.00
24 Mid-level scientists	48	7.13	3.85	29.45	20.81	8.65	213.35
26 Truck drivers	12	274.30	235.30	138.72	97.06	41.67	140.42
27 Taxi drivers	16	237.47	250.62	264.17	103.13	161.04	126.38

NOTE. — Explanations of columns:

- (1) The number of members of the occupation represented in the Berkeley-Duke sample.
- (2) Those individuals' own estimates of how much members of their occupation make in side income.
- (3) The average perceived side income for that occupation given by all the rest of the members of the sample. Adjusted for age, education, region, and second economy income to conform to the means of occupation representatives.
- (4) Average total second economy income, legal and illegal, by representatives of the occupation. Column (4) is the sum of columns (5) and (6).
- (5) Average earned on non-state sector jobs by actual labor activity of occupation representatives.
- (6) Average additional non-state income, presumed to consist mainly of income from bribes and theft of materials from the workplace.
- (7) Average official first economy labor income by occupation representatives.

^a Sample members' occupation is listed only as "physician" and is not broken down into these three sub-fields.

^b Sample members' occupation is an aggregate of elementary and secondary school teachers.

^c Sample members' occupation includes all university faculty, not just mathematics instructors.

The picture becomes somewhat more ambiguous as we look at panel B of Table 5. A comparison of column 4 ("All side income") with either columns 2 or 3 (perceptions by the occupation representatives and the public at large, respectively) suggests that perceptions rarely agree with reality. However, it is not clear this is the proper comparison to make. Note that the figures in the column headed "All side income" consist of two parts: private job earnings (in column 5), and bribes and theft (in column 6). There is in particular a serious problem of the definition of "private job earnings" and how they relate to "side income." In the Berkeley-Duke survey (Part E, from which these figures are taken), respondents report all earnings derived from jobs outside the official ("first") economy. Consider, for example, two teachers, one who moonlights as a cloakroom attendant in a restaurant and another who works extra as a tutor. Both would both report those earnings as "private job earnings." Yet, in perceptions of a typical teacher's side income, most people would probably assume the tutoring income is side income associated with the teaching profession, while the earnings from the cloakroom attendant's job are not. On the whole, then, we might expect column 4 to overstate the true level of side income, depending on the extent to which people in any given occupation tend to moonlight *outside* their primary occupation. With that caveat in mind, some of the occupations in Table 5 can be examined more closely. Medical workers, for instance, probably do not earn large amounts of money outside their main profession. Indeed, both nurses and doctors (taking a rough average of the three different categories of physicians) report side income fairly close to what they are perceived to be making. It is more difficult to justify the same sort of story for the other professions. Teachers and scientists, for instance, are likely to engage in a variety of private activities unrelated to their principal employment.

The general conclusion of this section, then, seems to be that the general public's perceptions of an occupation's side income are roughly consistent with perceptions by the (presumably better informed) representatives of that occupation themselves. It is more difficult to state any definite conclusion regarding perceived and actual side income, owing to the ambiguity of the definition of side income *associated with* an occupation. Tentatively, it appears that perceptions of side income tend to be lower than individuals' *total* second economy income (that is, all unofficial income, whether associated with their primary state occupation or not). We cannot, however, rule out the possibility that perceptions of the side income that is more directly associated with a job are accurate.

6.2. RESPONDENTS' OWN OCCUPATIONS AND BRANCHES

A second and more comprehensive test of the accuracy of perceptions of side income is to compare what all individual respondents (not just those in occupations listed among the 36) perceive as average side earnings in their own jobs with what they personally report as their actual side income. Question 1 of the survey asked about perceptions of side income of persons "in your own branch," while Question 2 asked about persons "in your own occupation in your own branch" (see Appendix A). If we assume that our respondents are distributed the same as the parent population in the respects that matter for perceptions, then these questions offer, in principle, an excellent opportunity for comparison of perceptions with reality, since each person is his or her own control.

In making these comparisons, we will follow our earlier approach of separating the sample into regional subgroups. That is, we will look at, say, Armenian engineers' perceptions of how much engineers in Armenia make in side income with what those same Armenian engineers report (elsewhere) that they themselves make. There are a total of 197 separate occupations represented in the sample. Some are heavily represented — e.g., engineers (164) or teachers (159) — while many others have only one or two representatives. The following investigation is limited to the 39 occupations with sample sizes of 10 or more. These 39 occupations account for 62% of the entire sample. Similarly, we consider the 19 branches with 10 or more representatives in the sample (accounting for about 75% of the entire sample).²⁰

On the following eight pages, Tables 6 and 7 report the average perceived side income and the actual side income for, respectively, the 39 occupations and the 19 branches, by region.²¹ As is evident from the tables, however, the small cell

²⁰ The definition of occupations in the survey is at approximately the same level of aggregation as the three-digit occupational groups used by the U.S. Department of Labor for the U.S. economy (see, e.g., the *Dictionary of Occupational Titles*, 1977). The branch codes used in the questionnaire data were roughly at the same level of aggregation as three-digit industry groups in the U.S. Standard Industrial Classification (SIC) system. The 19 branches mentioned above are created by combining these three-digit industry groups into two-digit major groups.

In practice, the difference between the specification by branch and by occupation in the Soviet economy is not great — not nearly as significant as in U.S. data for occupational classifications and industry classifications (the SIC codes). The occupational codes for the Berkeley-Duke questionnaire are only a slightly modified form of the codes used in the Soviet census — see *Itogi... 1973* — and those in turn follow an industry structure. (The census gives the distribution by occupation [*po zanyatiyam*] and by occupations within branches [*po zanyatiyam v otrastyakh*]). The result is that the branch classification is in some sense merely a more aggregated form of the occupational classification. The one major difference for our sample is that the large number of engineers (occupational code 522) are distributed across the branches in which they work.

²¹ Since the sample size in most cases is very small, I have not, as before, computed the mean perceived side income by a tobit regression. Rather, the means are simple means (with

sizes that result once the sample is divided into the four regions make the data on individual occupations and branches of limited value. To provide more robust results as well as a somewhat more manageable picture of these data, Tables 8 and 9 are summaries which present only the average values, over all the occupations and branches, of perceived side income and actual side income and its components, as well as official wages, for each region. Those averages are weighted by the number of sample members in each occupation. Figures 3-6 present some of the same information in graphical form. Two general trends are evident from both the tables and the figures. First, the conclusion stated in the last part of the preceding section seems to stand: perceptions of side income are generally either *higher* than (in the southern republics) or the same as (in the northern USSR) private job earnings, while they are *lower* than *total* side income (the sum of private job income and bribes/thefts) in all cases. Across all regions, perceived side income in the major occupations and branches of the Soviet economy accounts for only 65-75% of what the Berkeley-Duke survey participants report as their own unofficial income.²² Second, the relative importance of side income and official income is radically different in the North and the South (especially Armenia). As Figs. 4 and 6 show, official income and side income are nearly equal in Armenia, while in the two northern regions, side income is relatively much smaller (although hardly negligible).

category 8 responses set at 362.5 rubles/month — see note 2 in Appendix B). By thus failing to account for the censoring of the sample, it is safe to say that there is a general downward bias to the figures reported for perceived side income and that that bias is greater for occupations with high means.

²² The caveat of the preceding footnote still holds: failure to account for the censoring of the responses almost certainly means that the values for perceived side incomes are understated.

Table 6. A. Armenia:
 Perceived and Actual Side Income (Rubles/Month) in the 39
 Occupations Most Frequently Represented in the Berkeley-Duke
 Sample.

Code	Occupation	N	(1) Perceived side income	(2) Actual side income	(3) Private job income	(4) Theft and bribes	(5) Official earnings
1 061	Lathe operators	7	18.57	25.48	11.19	14.29	265.71
2 069	Tool and die makers	3	100.00	65.56	65.56	0.00	243.33
3 075	Mechanics	3	145.83	133.33	0.00	133.33	213.33
4 086	Welders	5	33.50	47.33	44.00	3.33	190.00
5 182	Apparel workers	7	23.93	28.57	0.00	28.57	129.29
6 259	Painters	3	266.67	590.00	573.33	16.67	110.00
7 332	Truck drivers	4	209.38	245.62	208.12	37.50	133.75
8 333	Taxi drivers	6	362.50	621.67	275.00	346.67	111.17
9 361	Retail sales personnel	9	258.33	319.44	114.81	204.63	85.56
10 382	Barbers	7	267.86	297.33	168.76	128.57	97.57
11 402	Auto repair	12	268.75	229.10	131.88	97.22	150.83
12 403	Tailors	9	225.00	389.93	389.93	0.00	71.67
13 407	Shoemakers	4	165.63	110.83	110.83	0.00	97.50
14 512	Mgrs., ind. eng. depts.	0	—	—	—	—	—
15 513	Mgrs., ind. prod. depts.	2	162.50	12.50	0.00	12.50	200.00
16 522	Engineers	14	53.93	58.04	15.18	42.86	190.36
17 523	Industrial designers	1	150.00	250.00	216.67	33.33	170.00
18 528	Foremen	1	75.00	0.00	0.00	0.00	170.00
19 529	Technicians	2	18.75	0.00	0.00	0.00	95.00
20 531	Draftsmen	0	—	—	—	—	—
21 532	Laboratory workers	4	81.25	226.25	200.00	26.25	126.25
22 562	Physicians	6	277.08	327.78	83.33	244.45	152.50
23 566	Nurses	7	115.00	157.24	58.43	98.81	112.14
24 581	Scientific researchers	4	56.25	37.50	0.00	37.50	295.00
25 582	University faculty	11	256.82	410.61	295.45	115.16	207.18
26 584	School teachers	30	28.08	73.39	42.75	30.64	137.33
27 585	Athletic coaches	2	0.00	6.25	0.00	6.25	135.00
28 586	Nursery school teachers	2	75.00	104.17	0.00	104.17	140.00
29 601	Librarians	2	8.75	12.50	0.00	12.50	95.00
30 612	Painters, sculptors	4	57.50	118.96	116.88	2.08	100.00
31 613	Musicians, singers	0	—	—	—	—	—
32 614	Other artists	2	0.00	25.00	0.00	25.00	205.00
33 672	Economists	1	0.00	0.00	0.00	0.00	120.00
34 673	Auditors	4	200.00	279.17	0.00	279.17	230.00
35 674	Bookkeepers	2	306.25	279.17	150.00	129.17	135.00
36 677	Cashiers	4	146.88	230.00	0.00	230.00	110.00
37 681	Computer programmers	0	—	—	—	—	—
38 721	Typists	3	55.83	50.00	50.00	0.00	110.00
39 722	Secretaries	5	15.00	11.67	10.00	1.67	111.00

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 6. B. Southern USSR (Excluding Armenia)
 Perceived and Actual Side Income (Rubles/Month) in the 39
 Occupations Most Frequently Represented in the Berkeley-Duke
 Sample.

Code	Occupation	N	(1) Perceived side income	(2) Actual side income	(3) Private job income	(4) Theft and bribes	(5) Official earnings
1 061	Lathe operators	0	—.—	—.—	—.—	—.—	—.—
2 069	Tool and die makers	0	—.—	—.—	—.—	—.—	—.—
3 075	Mechanics	3	37.50	11.33	11.33	0.00	130.00
4 086	Welders	2	18.75	10.00	0.00	10.00	165.00
5 182	Apparel workers	1	75.00	65.00	65.00	0.00	124.00
6 259	Painters	2	112.50	141.58	141.58	0.00	109.00
7 332	Truck drivers	4	118.75	125.00	50.00	75.00	130.00
8 333	Taxi drivers	1	75.00	100.00	0.00	100.00	120.00
9 361	Retail sales personnel	6	183.33	145.00	0.00	145.00	91.67
10 382	Barbers	6	101.79	180.36	15.00	165.36	113.57
11 402	Auto repair	2	200.00	133.33	125.00	8.33	95.00
12 403	Tailors	8	142.19	164.58	129.58	35.00	100.00
13 407	Shoemakers	1	75.00	100.00	0.00	100.00	100.00
14 512	Mgrs., ind. eng. depts.	4	90.63	75.00	0.00	75.00	155.75
15 513	Mgrs., ind. prod. depts.	7	176.79	229.05	4.05	225.00	155.29
16 522	Engineers	37	52.97	99.79	40.28	59.51	169.24
17 523	Industrial designers	0	—.—	—.—	—.—	—.—	—.—
18 528	Foremen	1	150.00	200.00	0.00	200.00	180.00
19 529	Technicians	0	—.—	—.—	—.—	—.—	—.—
20 531	Draftsmen	0	—.—	—.—	—.—	—.—	—.—
21 532	Laboratory workers	1	0.00	0.00	0.00	0.00	100.00
22 562	Physicians	11	155.21	269.28	186.92	82.36	169.67
23 566	Nurses	6	59.17	69.86	64.58	5.28	92.50
24 581	Scientific researchers	5	0.00	60.00	60.00	0.00	202.00
25 582	University faculty	3	30.83	33.33	0.00	33.33	139.33
26 584	School teachers	30	51.85	80.30	65.25	15.05	132.00
27 585	Athletic coaches	2	0.00	0.00	0.00	0.00	129.00
28 586	Nursery school teachers	2	2.50	5.00	0.00	5.00	75.00
29 601	Librarians	2	0.00	0.00	0.00	0.00	73.50
30 612	Painters, sculptors	3	75.00	156.14	156.14	0.00	140.67
31 613	Musicians, singers	1	37.50	0.00	0.00	0.00	122.00
32 614	Other artists	2	0.00	0.00	0.00	0.00	180.00
33 672	Economists	7	16.07	73.57	73.57	0.00	166.57
34 673	Auditors	0	—.—	—.—	—.—	—.—	—.—
35 674	Bookkeepers	9	58.33	44.44	0.00	44.44	102.89
36 677	Cashiers	1	150.00	150.00	0.00	150.00	80.00
37 681	Computer programmers	4	62.50	545.58	545.58	0.00	166.25
38 721	Typists	3	50.00	16.67	16.67	0.00	91.67
39 722	Secretaries	3	1.67	3.00	3.00	0.00	75.00

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 6. C. Moscow/Leningrad
Perceived and Actual Side Income (Rubles/Month) in the 39
Occupations Most Frequently Represented in the Berkeley-Duke
Sample.

Code	Occupation	N	(1) Perceived side income	(2) Actual side income	(3) Private job income	(4) Theft and bribes	(5) Official earnings
1 061	Lathe operators	1	37.50	233.33	150.00	83.33	185.00
2 069	Tool and die makers	1	75.00	417.00	417.00	0.00	300.00
3 075	Mechanics	0	—	—	—	—	—
4 086	Welders	5	22.00	29.27	12.60	16.67	218.00
5 182	Apparel workers	0	—	—	—	—	—
6 259	Painters	0	—	—	—	—	—
7 332	Truck drivers	1	150.00	89.17	89.17	0.00	160.00
8 333	Taxi drivers	2	75.00	87.50	0.00	87.50	147.50
9 361	Retail sales personnel	5	41.00	30.00	0.00	30.00	86.60
10 382	Barbers	10	80.25	115.02	82.02	33.00	92.80
11 402	Auto repair	3	150.00	199.44	155.00	44.44	176.67
12 403	Tailors	0	—	—	—	—	—
13 407	Shoemakers	1	362.50	250.00	250.00	0.00	0.00
14 512	Mgrs., ind. eng. depts.	15	26.50	11.69	2.67	9.02	250.33
15 513	Mgrs., ind. prod. depts.	4	37.50	29.17	0.00	29.17	172.50
16 522	Engineers	54	12.82	11.37	4.69	6.68	178.85
17 523	Industrial designers	6	1.67	0.00	0.00	0.00	165.00
18 528	Foremen	3	36.67	39.44	28.33	11.11	183.33
19 529	Technicians	4	41.00	41.83	39.33	2.50	108.60
20 531	Draftsmen	6	6.25	0.00	0.00	0.00	106.83
21 532	Laboratory workers	9	8.89	3.75	2.22	1.53	99.67
22 562	Physicians	15	25.94	23.51	17.05	6.46	156.25
23 566	Nurses	3	30.83	23.67	23.67	0.00	86.00
24 581	Scientific researchers	27	12.84	24.61	24.09	0.52	209.00
25 582	University faculty	6	37.50	157.22	126.67	30.55	250.33
26 584	School teachers	39	41.06	65.34	62.70	2.64	142.22
27 585	Athletic coaches	3	62.50	66.67	66.67	0.00	226.67
28 586	Nursery school teachers	3	26.67	18.33	18.33	0.00	105.00
29 601	Librarians	10	0.50	1.00	0.00	1.00	95.20
30 612	Painters, sculptors	13	160.58	276.60	265.71	10.89	152.77
31 613	Musicians, singers	12	65.63	8.89	8.75	0.14	162.33
32 614	Other artists	3	1.67	0.00	0.00	0.00	190.67
33 672	Economists	7	5.36	0.00	0.00	0.00	105.71
34 673	Auditors	3	3.33	0.00	0.00	0.00	149.00
35 674	Bookkeepers	6	18.75	18.33	10.00	8.33	109.33
36 677	Cashiers	2	27.50	0.00	0.00	0.00	55.00
37 681	Computer programmers	9	0.00	29.52	29.52	0.00	173.33
38 721	Typists	2	27.50	6.50	6.50	0.00	74.00
39 722	Secretaries	2	18.75	86.00	86.00	0.00	81.50

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 6. D. Northern USSR (Excluding Moscow/Leningrad)
 Perceived and Actual Side Income (Rubles/Month) in the 39
 Occupations Most Frequently Represented in the Berkeley-Duke
 Sample.

Code	Occupation	N	(1) Perceived side income	(2) Actual side income	(3) Private job income	(4) Theft and bribes	(5) Official earnings
1 061	Lathe operators	7	16.79	290.60	285.71	4.89	233.57
2 069	Tool and die makers	6	11.67	10.47	5.33	5.14	183.33
3 075	Mechanics	9	49.72	64.04	64.04	0.00	183.56
4 086	Welders	19	22.63	38.17	19.53	18.64	152.79
5 182	Apparel workers	4	37.00	137.00	137.00	0.00	113.40
6 259	Painters	5	63.50	151.07	151.07	0.00	139.80
7 332	Truck drivers	3	112.50	31.00	14.33	16.67	156.67
8 333	Taxi drivers	7	69.64	31.67	0.00	31.67	134.29
9 361	Retail sales personnel	11	72.05	78.26	0.00	78.26	111.64
10 382	Barbers	22	63.07	76.99	45.00	31.99	108.50
11 402	Auto repair	5	147.50	195.50	186.33	9.17	151.00
12 403	Tailors	18	105.83	97.16	78.82	18.34	86.89
13 407	Shoemakers	9	73.75	154.77	131.43	23.34	95.40
14 512	Mgrs., ind. eng. depts.	12	18.54	32.25	15.58	16.67	235.92
15 513	Mgrs., ind. prod. depts.	18	48.55	192.69	144.45	48.24	210.16
16 522	Engineers	56	16.55	18.39	8.65	9.74	159.83
17 523	Industrial designers	3	30.83	125.00	0.00	125.00	173.33
18 528	Foremen	7	14.38	12.81	8.13	4.68	189.38
19 529	Technicians	14	37.83	24.23	17.46	6.77	155.87
20 531	Draftsmen	8	5.63	7.50	7.50	0.00	95.38
21 532	Laboratory workers	9	22.50	6.17	0.00	6.17	101.20
22 562	Physicians	19	56.88	41.17	27.00	14.17	198.40
23 566	Nurses	17	23.61	36.07	29.78	6.29	88.89
24 581	Scientific researchers	10	11.25	25.00	0.00	25.00	199.00
25 582	University faculty	1	150.00	0.00	0.00	0.00	400.00
26 584	School teachers	55	40.60	59.07	57.40	1.67	131.90
27 585	Athletic coaches	5	14.50	4.00	4.00	0.00	136.00
28 586	Nursery school teachers	12	12.12	31.31	15.99	15.32	107.31
29 601	Librarians	8	0.63	0.00	0.00	0.00	80.88
30 612	Painters, sculptors	4	37.50	55.00	55.00	0.00	93.00
31 613	Musicians, singers	7	50.71	29.00	26.62	2.38	137.57
32 614	Other artists	6	19.58	26.94	26.94	0.00	100.17
33 672	Economists	11	71.25	42.01	0.00	42.01	150.67
34 673	Auditors	5	16.25	18.61	8.33	10.28	113.83
35 674	Bookkeepers	29	15.73	4.25	0.00	4.25	115.16
36 677	Cashiers	8	44.38	56.15	3.75	52.40	82.88
37 681	Computer programmers	3	0.00	91.67	91.67	0.00	131.33
38 721	Typists	4	51.25	46.25	46.25	0.00	81.25
39 722	Secretaries	9	3.06	44.74	37.33	7.41	75.78

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 7.

A. Armenia:

Perceived and Actual Side Income (Rubles/Month) in the 19 Branches
Most Frequently Represented in the Berkeley-Duke Sample.

Code	Occupation	N	(1) Perceived side income	(2) Actual side income	(3) Private job income	(4) Theft and bribes	(5) Official earnings
1 010	Power industry	4	146.88	161.25	7.08	154.17	125.00
2 020	Mining, oil, and gas	0	—	—	—	—	—
3 060	Metal working	31	62.89	63.30	58.87	4.43	205.56
4 090	Chemicals	11	53.41	81.82	45.45	36.37	180.45
5 160	Textiles	9	41.67	122.22	0.00	122.22	154.44
6 180	Apparel	10	16.75	20.00	0.00	20.00	122.00
7 190	Leather and footwear	7	118.57	277.69	256.26	21.43	141.43
8 210	Food	4	190.63	208.33	83.33	125.00	153.75
9 230	Medical equipment	5	95.00	80.00	0.00	80.00	134.00
10 250	Construction	22	222.73	248.67	140.33	108.34	177.27
11 330	Road transport	15	294.53	359.64	144.22	215.42	133.56
12 380	Consumer services	18	267.76	303.38	224.43	78.95	120.95
13 560	Health and medical	19	252.63	188.46	69.60	118.86	138.16
14 580	Education	53	76.60	161.40	96.81	64.59	146.30
15 590	Media and publishing	5	87.50	10.00	0.00	10.00	160.00
16 600	Culture and recreation	3	45.00	190.00	180.00	10.00	115.00
17 640	Communications	8	101.56	143.75	0.00	143.75	143.13
18 650	Trade, dining, supply	16	254.41	316.91	60.78	256.13	93.82
19 700	Housing and munic. svcs.	3	215.63	177.08	37.50	139.58	222.50

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 7. B. Southern USSR (Excluding Armenia)
 Perceived and Actual Side Income (Rubles/Month) in the 19 Branches
 Most Frequently Represented in the Berkeley-Duke Sample.

Code	Occupation	N	(1)	(2)	(3)	(4)	(5)
			Perceived side income	Actual side income	Private job income	Theft and bribes	Official earnings
1 010	Power industry	2	0.00	0.00	0.00	0.00	155.00
2 020	Mining, oil, and gas	7	0.00	57.79	57.79	0.00	167.13
3 060	Machine-building	13	45.19	130.49	130.49	0.00	193.46
4 090	Chemicals	4	18.75	0.00	0.00	0.00	178.75
5 160	Textiles	6	100.00	114.57	86.24	28.33	113.17
6 180	Apparel	1	37.50	34.00	34.00	0.00	110.00
7 190	Leather and footwear	5	121.00	214.73	139.73	75.00	123.00
8 210	Food	7	25.45	70.61	7.27	63.34	135.09
9 230	Medical equipment	2	37.50	140.00	0.00	140.00	132.00
10 250	Construction	10	45.91	101.89	19.62	82.27	181.36
11 330	Road transport	2	218.75	175.00	125.00	50.00	105.00
12 380	Consumer services	21	78.85	123.35	34.42	88.93	110.00
13 560	Health and medical	28	116.05	184.33	123.47	60.86	151.23
14 580	Education	39	42.07	57.76	44.19	13.57	129.44
15 590	Media and publishing	2	25.00	0.00	0.00	0.00	200.00
16 600	Culture and recreation	10	43.75	55.80	5.80	50.00	125.30
17 640	Communications	0	—	—	—	—	—
18 650	Trade, dining, supply	17	154.41	180.59	0.00	180.59	110.94
19 700	Housing and munic. svcs.	5	42.19	62.50	0.00	62.50	187.50

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 7.

C. Moscow/Leningrad:

Perceived and Actual Side Income (Rubles/Month) in the 19 Branches
Most Frequently Represented in the Berkeley-Duke Sample.

Code	Occupation	N	(1) Perceived side income	(2) Actual side income	(3) Private job income	(4) Theft and bribes	(5) Official earnings
1 010	Power industry	0	—	—	—	—	—
2 020	Mining, oil, and gas	10	1.75	1.30	1.30	0.00	148.40
3 060	Machine-building	46	19.89	31.77	26.79	4.98	182.81
4 090	Chemicals	11	3.46	21.79	13.08	8.71	199.77
5 160	Textiles	0	—	—	—	—	—
6 180	Apparel	0	—	—	—	—	—
7 190	Leather and footwear	0	—	—	—	—	—
8 210	Food	7	26.43	14.40	0.00	14.40	140.29
9 230	Medical equipment	3	18.33	48.78	21.00	27.78	160.00
10 250	Construction	24	23.96	26.65	7.08	19.57	168.00
11 330	Road transport	6	84.38	120.31	69.27	51.04	151.88
12 380	Consumer services	14	80.63	150.64	124.29	26.35	102.00
13 560	Health and medical	33	35.13	34.19	29.69	4.50	146.97
14 580	Education	50	32.84	61.48	55.97	5.51	158.12
15 590	Media and publishing	13	13.57	36.73	29.94	6.79	172.71
16 600	Culture and recreation	49	38.48	65.22	57.59	7.63	131.27
17 640	Communications	4	83.75	74.17	74.17	0.00	184.50
18 650	Trade, dining, supply	10	84.09	119.70	14.39	105.31	90.00
19 700	Housing and munic. svcs.	8	29.06	54.06	52.50	1.56	137.75

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 7. D. Northern USSR (Excluding Moscow/Leningrad):
 Perceived and Actual Side Income (Rubles/Month) in the 19 Branches
 Most Frequently Represented in the Berkeley-Duke Sample.

Code	Occupation	N	(1) Perceived side income	(2) Actual side income	(3) Private job income	(4) Theft and bribes	(5) Official earnings
1 010	Power industry	7	23.93	0.00	0.00	0.00	183.00
2 020	Mining, oil, and gas	17	8.06	13.52	7.13	6.39	178.33
3 060	Machine-building	69	19.89	26.68	15.11	11.57	169.99
4 090	Chemicals	7	21.56	52.50	0.00	52.50	169.00
5 160	Textiles	8	8.27	25.23	24.33	0.90	147.69
6 180	Apparel	11	22.50	80.86	41.28	39.58	140.00
7 190	Leather and footwear	8	37.50	78.44	75.94	2.50	111.25
8 210	Food	7	28.86	28.26	25.00	3.26	123.36
9 230	Medical equipment	9	29.58	23.50	11.28	12.22	148.75
10 250	Construction	51	52.45	91.79	71.02	20.77	191.96
11 330	Road transport	19	66.19	94.15	47.52	46.63	171.33
12 380	Consumer services	78	66.07	109.49	82.05	27.44	112.58
13 560	Health and medical	54	38.06	30.81	22.77	8.04	134.73
14 580	Education	69	28.24	45.52	41.53	3.99	125.09
15 590	Media and publishing	6	6.67	0.00	0.00	0.00	125.00
16 600	Culture and recreation	27	30.00	38.18	31.04	7.14	101.59
17 640	Communications	8	7.50	6.67	4.58	2.09	116.75
18 650	Trade, dining, supply	49	86.35	110.84	37.23	73.61	121.92
19 700	Housing and munic. svcs.	17	46.90	170.36	143.53	26.83	146.48

NOTE. — Column (2) is the sum of columns (3) and (4).

Table 8. Average Perceived and Actual Side Incomes and Official Wages (Rubles/Month) for 39 Leading Occupations, by Region.

Occupation	Region			
	Armenia (N=192)	South (N=177)	Moscow— Leningrad (N=295)	North (N=465)
1 Perceived side income	134.3	74.6	34.2	37.8
2 Actual side income (total)	181.5	115.2	45.9	54.5
3 Private job income	104.6	64.4	38.4	39.4
4 Theft and bribes	76.9	50.9	7.5	15.2
5 Official wage	148.3	139.3	159.7	139.8
6 Row 1 + Row 3	1.28	1.16	0.89	0.96
7 Row 1 + Row 5	0.91	0.54	0.21	0.27

SOURCE: The rows are the weighted averages of the columns for all 39 occupations in Table 6, panels A-D, where the weights are the number of representatives in each occupation.

Table 9. Average Perceived and Actual Side Incomes and Official Wages (Rubles/Month) for 19 Leading Branches, by Region.

Occupation	Region			
	Armenia (N=243)	South (N=181)	Moscow— Leningrad (N=288)	North (N=521)
1 Perceived side income	143.4	71.4	33.7	42.1
2 Actual side income (total)	180.3	110.4	52.9	64.9
3 Private job income	89.9	54.2	40.4	43.9
4 Theft and bribes	90.4	56.2	12.5	21.0
5 Official wage	150.3	140.4	153.1	141.4
6 Row 1 + Row 3	1.60	1.32	0.83	0.96
7 Row 1 + Row 5	0.95	0.51	0.22	0.30

SOURCE: The rows are the weighted averages of the columns for all 19 branches in Table 7, panels A-D, where the weights are the number of representatives in each branch.

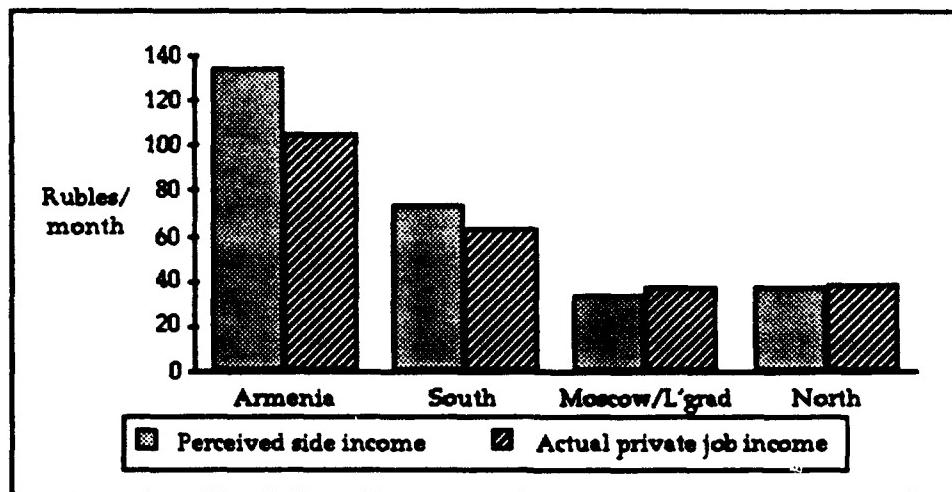


Fig. 3.— Comparison of Perceived Side Income and Actual Private Job Income in 39 Occupations, by Region.

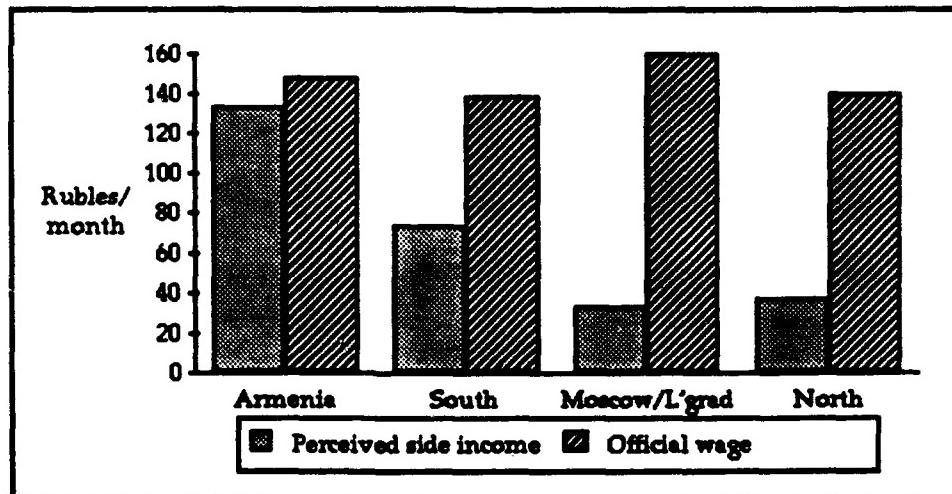


Fig. 4.— Comparison of Perceived Side Income and Official Wage in 39 Occupations, by Region.

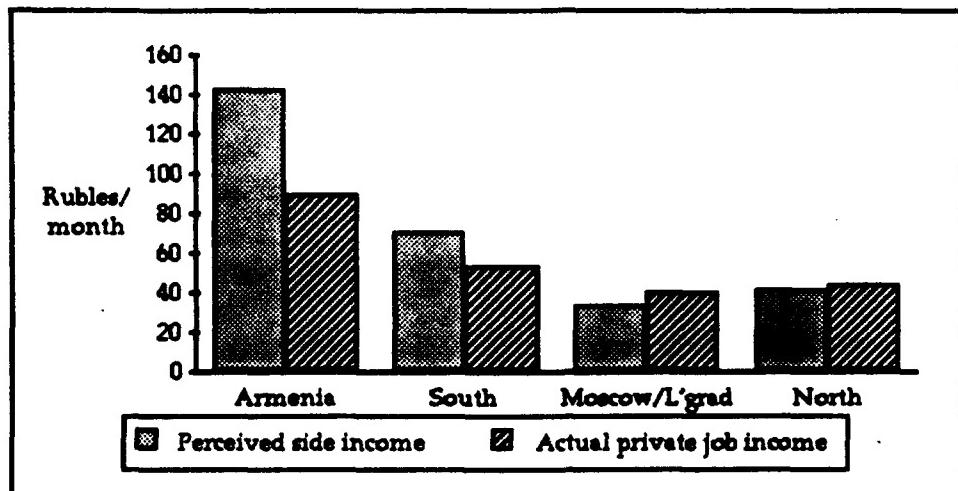


Fig. 5. — Comparison of Perceived Side Income and Actual Private Job Income in 19 Branches, by Region.

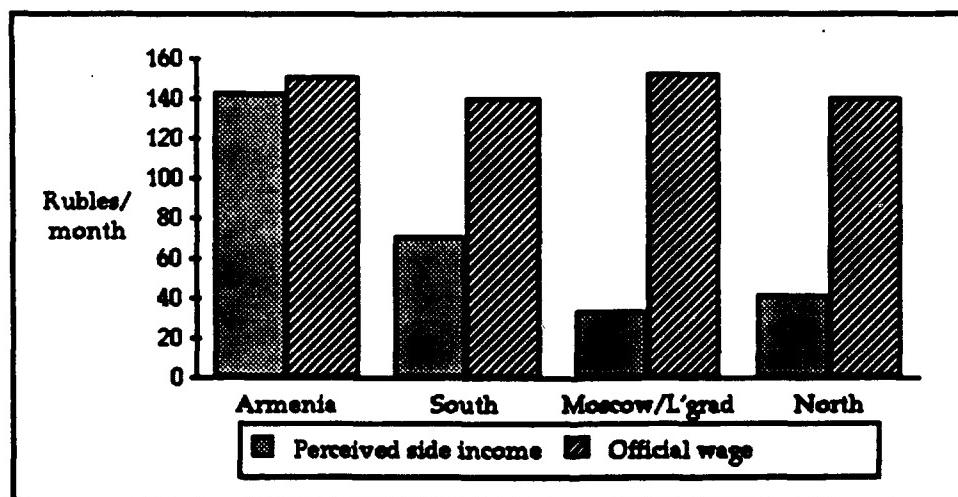


Fig. 6. — Comparison of Perceived Side Income and Official Wage in 19 Branches, by Region.

7. THE SITUATION IN THE LATE 1980S

One of the major unanswered questions about the Soviet second economy is that of its dynamics over the decade of the 1980s. According to a leading specialist on the subject, Tat'yana KORYAGINA [1990a, 1990b], Soviet estimates of how much the second economy grew from the early 1960s to the late 1980s vary enormously, from a low estimate of a 4-fold increase during these 25 years to a high of 30-fold. On the Western side, there has been no serious attempt at an estimate of second economy growth. The present section attempts to investigate this issue in light of our conclusion above that perceptions may, with caution, be used as a measure of actual second economy activity. To do so, we compare Soviet citizens' perceptions of side income in the late 1980s with the perceptions discussed so far in this paper, from the late 1970s.

The new data come from a small survey of emigrants who arrived in the United States in the late 1980s. A portion of Part B of the original Berkeley-Duke survey, consisting of Questions 4-24 (the list of 36 occupations), plus questions on the respondent's age, educational level, and city of residence in the USSR, was administered to a sample of 83 individuals from Moscow, Leningrad, and Novgorod. Their mean year of departure was 1988. A table of descriptive means of the sample may be found in Appendix B, note 5. Although, for purposes of comparability, the format of the old survey instrument (including such problematic features as the use of income ranges rather than specific ruble values) was retained, there was one important difference in the design of the questionnaire administered to the new sample. The original survey had an uppermost interval of "Over 300 rubles/month" in perceived side income. Since there was a strong suspicion that keeping 300 rubles as the censoring point would lead to massive censoring of responses for several occupations, the response scale was expanded to 10 intervals. The open-ended interval 8 was replaced by a closed-ended interval ("301-425 rubles/month"), and a new interval 9 ("426-600 rubles/month") and interval 10 ("Over 600 rubles/month") were added. Note 2 in Appendix B explains how these values were chosen.

Table 10 summarizes the results of the new survey and compares them to the original study. Since the new sample is predominantly from the Moscow-Leningrad regions, the comparison applies only to that subsample in the earlier survey. Several points are to be noted:

Table 10. Growth in Perceptions of Side Incomes in Moscow and Leningrad from the Late 1970s to the Late 1980s.

Occupation	(1) Mean estimate for 1988 (N=83)	(2) Mean estimate for 1979 (N=560)	(3) % increase in 9-year period
1 Retail trade, workers	248.65	130.64	90%
2 Retail trade, managers	544.64	329.18	65%
3 Public dining, workers	250.30	138.13	81%
4 Public dining, managers	516.57	328.75	57%
5 State supply, workers	302.75	147.35	105%
6 State supply, managers	822.89	312.98	163%
7 Construction, workers	76.33	36.06	112%
8 Construction, managers	115.44	57.47	101%
9 Local industry, workers	50.90	52.11	-2%
10 Local industry, managers	272.25	181.64	50%
11 Heavy industry, workers	22.34	16.46	36%
12 Minor employees	7.41	5.92	25%
13 District physicians	42.87	26.21	64%
14 Hospital physicians	96.02	62.20	54%
15 Surgeons	186.72	161.81	15%
16 Dentists and dental technicians	435.36	253.78	72%
17 Nurses	55.25	43.37	27%
18 Hospital attendants	39.41	35.38	11%
19 Pharmacists	93.78	36.71	155%
20 Elementary school teachers	5.06	9.92	-49%
21 HS math. and physics teachers	36.07	38.20	-6%
22 University mathematics instructors	150.63	86.27	75%
23 Librarians	3.23	3.44	-6%
24 Mid-level scientists	17.97	4.11	337%
25 Social security employees	46.90	26.26	79%
26 Truck drivers	241.51	171.37	41%
27 Taxi drivers	293.33	181.93	61%
28 State car drivers	173.86	88.73	96%
29 Plumbers	128.91	67.77	90%
30 Watchmen	103.95	13.66	661%
31 Janitors	86.75	10.15	755%
32 Elevator operators	72.32	6.48	1,016%
33 Receivers of empty bottles	372.77	215.16	78%
34 Receivers of scrap metal	395.28	259.11	53%
35 Funeral workers	560.26	239.20	134%
36 Funeral management	1,283.17	411.54	212%

Note.—Column (1) is the mean of a sample of 83 former residents of Moscow, Leningrad, and Novgorod. Column (2) is from the column for Moscow/Leningrad from Table 4. Both means have been adjusted to account for sample censoring.

- (1) The unweighted average rate of increase for the 36 occupations in perceived side income over the nine-year period between the two samples' departure from the Soviet Union (1979 to 1988) is 136%. This represents an annual growth rate of 10.0%. If we exclude the three occupations which show growth rates of over 600%, the average is 75% — an annual rate of 6.4%.²³
- (2) One major difference in the two samples used for comparison here is the age of the respondents. The members of the original Moscow-Leningrad subsample were on average 47.1 years old when they left the Soviet Union in the late 1970s. The new sample was only 34.6 years old at the time of departure. Not only is this a very large difference in years; it also means the later sample is an entirely new generation. While the mean year of birth of the original sample was 1932, for the new sample it was 1953. It is risky to even speculate what the effect such a generational difference might be. If, however, we limit ourselves to the age factor alone, we can note that in the original sample (see Section 4), age had a U-shaped effect with a minimum at around 40–44 years, so that individuals in their mid-30s offered systematically higher perceptions than those in their early 40s. In the original sample, the difference between a respondent of age 35 and one of age 47 was roughly 20% (with the younger person offering a 20% *higher* estimate). If we assume that the same pattern persists in the later sample, this would imply that had the later sample been of the same average age as the first sample, the estimates would have been lower. This age effect would reduce an apparent 75% increase in perceptions over the nine-year period to around 40%.
- (3) The rates of increase shown in column (3) of Table 10 and discussed above are nominal growth rates; we have not taken into account the significant inflation that most observers agree has taken place in the Soviet economy over the past decade. Although there are no official inflation rates for the Soviet economy to be used to deflate the figures, Table 11 presents various proxies.

²³ In her above-cited discussion of the range of estimates of second economy growth of 4 to 30 times from the early 1960s to the late 1980s, KORYAGINA [1990a, 1990b] chooses as her working hypothesis an intermediate value of an 18-fold increase. This works out to approximately a 12% annual growth rate. Observe, however, that the rate of growth of the second economy as a whole may be something quite different from the rate of growth of average second economy incomes. The latter concept relates to income per member of an occupation. If the number of people engaged in an occupation grows, or if new occupations begin to participate in the second economy, the total amount of side income will grow faster than per capita side incomes.

Table 11. Measures of Price Increases in the Soviet Economy,
1979-1988.

	(1) % annual increase	(2) % growth 1979-1988
1. State retail prices	1.1%	10.0%
2. Wholesale prices, recorded	1.4%	12.9%
3. Wholesale prices, recorded + unrecorded	4.0%	42.5%
4. Kolkhoz market, all products	2.0%	19.3%
Kolkhoz market, meat and meat products	4.1%	43.2%
5. Wages	3.0%	30.7%
7. Wages + social consumption fund	3.5%	36.3%

SOURCES. — Rows (1), (4), (5), (6), (7) are official data from *Narkhoz*. Rows (2) and (3) are extrapolated from KHANIN'S [1989] estimates for 1976-1986.

If the higher range of these inflation estimates is accepted, i.e., around 40%, this would imply that side incomes have almost exactly kept pace with real inflation, and hence that the real growth rate of per capita side income was zero during most of the 1980s.

- (4) Finally, notice the phenomenon of several new occupations "joining" the second economy. In the late 1970s, watchmen, janitors, and elevator operators were perceived as occupations with virtually no side income at all. Today, they are seen as making huge unofficial supplements to their official earnings. Yet, at the same time, other occupations — minor employees, teachers, and librarians — continue to remain outside. It is tempting to interpret both these groups of occupations as symbolic of broader trends in the Soviet economy. If indeed average real second economy income has kept pace with actual inflation over the past decade, at the same time that some new occupations and groups have been drawn in while others remain outside, this could be of major social and political importance. Both for individuals and for society as a whole there has been a very substantial shift in personal income from official and legal sources to the unofficial and illegal.

APPENDIX A

TRANSLATION OF PART B OF THE BERKELEY-DUKE QUESTIONNAIRE ON HOUSEHOLD BUDGETS IN THE USSR

Interviewer _____
Family No. _____

Family member No. _____

The questionnaire is intended for all family members over the age of 16 during the last normal year.

I. SURVEY OF PUBLIC OPINION ON ADDITIONAL INCOME IN VARIOUS OCCUPATIONAL CATEGORIES IN THE USSR

As is generally known, different positions and occupations in the USSR provide different opportunities for obtaining additional forms of income: moonlighting [khalturnyye], side-payments [levyye], tips [chayevyye], as well as other income from private activity, both official and unofficial. For example: a) working for private parties or working privately for state, cooperative, and "public" enterprises, institutions, and organizations; b) taking advantage of various means afforded by one's own position (tips, extortion [pobory], bribes [vzyatki], carrying out various articles from the workplace [vynos], embezzlement [khishcheniya], deceiving customers, etc.). Such income can be both in money and in kind.

On the following pages we provide you with a table of various occupations and jobs. Please put an 'X' in the corresponding columns in accordance with your perception of the opportunities for additional monthly income in these occupational categories, on the average, shortly before your departure from the USSR. If the incidence of additional income is irregular in the course of a year, then indicate the average monthly income obtained by dividing the estimated yearly income by twelve.

Do not include income from working overtime at your place of work and from second jobs that were officially sanctioned. Estimate the value of income in kind in terms of money.

If at the time of your departure you lived in the Transcaucasus or Central Asia, answer the questions in this section of the questionnaire (Section I) only in relation to the republic in which you lived.

Such income amounted approximately
to (net, in rubles per month):

	None	Under 10	11- 25	26- 50	51- 100	101- 200	201- 300	Over 300
1. All workers in your branch (sub-branch) in the USSR (write in the branch or sub-branch)	1	2	3	4	5	6	7	8
2. All workers in your profession in your (sub-) branch	1	2	3	4	5	6	7	8
3. All workers occupying your position in your (sub-) branch	1	2	3	4	5	6	7	8
4. Workers in trade in the USSR: a. ordinary workers	1	2	3	4	5	6	7	8
b. materially responsible persons and management	1	2	3	4	5	6	7	8
5. Workers in public eating establishments in the USSR: a. ordinary workers	1	2	3	4	5	6	7	8
b. materially responsible persons and management	1	2	3	4	5	6	7	8
6. Workers in state supply and marketing organizations: a. ordinary workers	1	2	3	4	5	6	7	8
b. materially responsible persons and management	1	2	3	4	5	6	7	8

Such income amounted approximately
to (net, in rubles per month):

	None	Under 10	11-25	26-50	51-100	101-200	201-300	Over 300
7. In housing and industrial construction in the USSR: a. construction workers	1	2	3	4	5	6	7	8
b. engineering and technical personnel on the construction site	1	2	3	4	5	6	7	8
8. In local industry: a. workers	1	2	3	4	5	6	7	8
b. enterprise directors and shop superintendents	1	2	3	4	5	6	7	8
9. Workers at large factories in heavy industry	1	2	3	4	5	6	7	8
10. Minor employees of various establishments in the USSR	1	2	3	4	5	6	7	8
11. Medical workers in the USSR: a. district physicians	1	2	3	4	5	6	7	8
b. clinical physicians (excluding dentists)	1	2	3	4	5	6	7	8
c. surgeons	1	2	3	4	5	6	7	8
d. dentists and dental technicians	1	2	3	4	5	6	7	8
e. nurses	1	2	3	4	5	6	7	8

Such income amounted approximately
to (net, in rubles per month):

	None	Under 10	11-25	26-50	51-100	101-200	201-300	Over 300
(11.) f. hospital attendants	1	2	3	4	5	6	7	8
g. pharmacists	1	2	3	4	5	6	7	8
12. Teachers: a. in elementary schools	1	2	3	4	5	6	7	8
b. of mathematics and physics in high schools	1	2	3	4	5	6	7	8
13. Mathematics instructors in higher educational institutions	1	2	3	4	5	6	7	8
14. Librarians	1	2	3	4	5	6	7	8
15. Mid-level scientific workers in scientific research institutions	1	2	3	4	5	6	7	8
16. Social security employees	1	2	3	4	5	6	7	8
17. Drivers: a. of long-distance cargo trucks	1	2	3	4	5	6	7	8
b. of taxis	1	2	3	4	5	6	7	8
c. of state cars	1	2	3	4	5	6	7	8

Such income amounted approximately
to (net, in rubles per month):

	None	Under 10	11-25	26-50	51-100	101-200	201-300	Over 300
18. Plumbers	1	2	3	4	5	6	7	8
19. Watchmen	1	2	3	4	5	6	7	8
20. Janitors	1	2	3	4	5	6	7	8
21. Elevator operators	1	2	3	4	5	6	7	8
22. Receivers of recycled bottles	1	2	3	4	5	6	7	8
23. Receivers of recycled waste and scrap	1	2	3	4	5	6	7	8
24. Workers at funeral bureaus, cemeteries, crematoriums: a. ordinary personnel	1	2	3	4	5	6	7	8
b. management	1	2	3	4	5	6	7	8

Such income amounted approximately
to (net, in rubles per month):

	None	Under 10	11-25	26-50	51-100	101-200	201-300	Over 300

25. Add occupations which, in your opinion, afford good opportunities for various types of additional earnings and indicate their net additional monthly incomes. If there is not enough space, write on the back.

a.	1	2	3	4	5	6	7	8
----	---	---	---	---	---	---	---	---

b.	1	2	3	4	5	6	7	8
----	---	---	---	---	---	---	---	---

c.	1	2	3	4	5	6	7	8
----	---	---	---	---	---	---	---	---

d.	1	2	3	4	5	6	7	8
----	---	---	---	---	---	---	---	---

e.	1	2	3	4	5	6	7	8
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APPENDIX B
TECHNICAL NOTES

NOTE 1. CENSORED SAMPLES

A data sample is said to be *censored* if the actual values of the variable are observed in only some of its ranges, while in others we know only that there is an observation, but not its value. MADDALA [1983, Chapter 6] analyzes such cases in detail. For example, consider a variable y^* , distributed normally with mean μ and variance σ^2 . Suppose we take a sample of size n ($y_1^*, y_2^*, y_3^*, \dots, y_n^*$), but instead of recording the exact values, we record only the values of y^* that are less than some threshold value, c . For the values of y^* which are greater than c , we record only the value c . That is, the recorded observations are

$$\begin{aligned} y_i &= y_i^* && \text{if } y_i^* < c \\ y_i &= c && \text{otherwise.} \end{aligned} \quad [\text{B.1}]$$

The sample that we actually observe ($y_1, y_2, y_3, \dots, y_n$) is a *censored* sample. For observations where $y_i = c$, all we know is that $y_i^* \geq c$. This implies that

$$\text{Prob}(y_i = c) = \text{Prob}(y_i^* \geq c). \quad [\text{B.2}]$$

Knowledge of this fact can be utilized to estimate the parameters μ and σ^2 .

The properties of the truncated normal distribution can also be utilized for multivariate regression. TOBIN [1958] was the first to study such a censored normal regression model. Assume the same type of censoring as described above, with a threshold c . Suppose in addition that the original variable y^* defined above can be modeled as a linear combination

$$y_i^* = \beta'x_i + u_i \quad [\text{B.3}]$$

where the u_i are residuals distributed $N(0, \sigma^2)$. Then Eq. [B.1] becomes

$$\begin{aligned} y_i &= \beta'x_i + u_i && \text{if } \beta'x_i + u_i < c \\ y_i &= c && \text{otherwise.} \end{aligned} \quad [\text{B.4}]$$

The problem of estimating β and σ^2 on the basis of n observations of y_i and x_i gave rise to Tobin's regression technique, or "tobit." The tobit regressions in this

paper were all performed using the LIFEREG procedure in the SAS statistical package.

**NOTE 2. CONVERSION OF THE 1-8 SCALE
TO RUBLE VALUES**

In Table 2 and the following parts of this paper, responses originally observed as values of 1-7 were converted to ruble values by taking the midpoint of each ruble interval (see the scale in Appendix A). For instance, an interval 3 choice ("11-25 rubles/month") was deemed to be equal to 18 rubles. For certain purposes (including that of designing a new questionnaire to be administered to emigrants from the last couple of years — see Section 7), it was necessary to construct new intervals beyond 7. Although the original scale was not based on any precise formula of conversion between the integer values of the scale and corresponding ruble values, it was nevertheless felt that an extension of the scale to higher intervals should try to preserve the approximate relationship between the integer values and the ruble values. To find the most suitable functional relationship, I fit equations of the form

$$y_i = f(x_i) \quad i = 1, \dots, 7, \quad [B.5]$$

where the x_i are the original (1-7) intervals and the y_i are the ruble values of the midpoints or upper bounds of those intervals. E.g., if the midpoints of the intervals were chosen, $0 = f(1)$, $5 = f(2)$, $18 = f(3)$, etc. If the upper bounds were chosen, then $0 = f(1)$, $10 = f(2)$, $25 = f(3)$, etc. Four specifications for $f(\cdot)$ were tested: (1) linear, (2) quadratic, (3) cubic, and (4) logarithmic. The best fit proved to be the logarithmic specification using the upper bound of each interval:

$$y_i = a \cdot x_i^b \quad i = 1, \dots, 7 \quad [B.6]$$

The parameters which provided the best fit were $a = 1.0914$ and $b = 2.8655$. This implied that a closed-ended interval 8 should be "301-425 rubles/month," that interval 9 would be "426-600 rubles/month," and that interval 10 would be "601-800 rubles/month."

NOTE 3. OFFICIAL WAGES IN 1979 AND 1988

Table B.1. Average Monthly Official Wages (in Rubles) in Various Branches of the Soviet Economy in 1979 and 1988

Sector		Average pay 1979	1988
All Sectors		163.3	219.8
Industry		172.9	240.8
Transportation		192.8	260.1
Communications		142.6	196.4
Construction		196.6	288.9
Retail Trade and Public Dining		128.8	165.1
Housing, Municipal and Consumer Services		126.7	168.0
Health		119.1	152.5
Education		133.3	171.4
Culture		104.7	128.2
Arts		124.1	155.1
Science		173.6	248.4
Credit and State Insurance		151.5	206.4
Government Administration		147.8	203.9

SOURCE: 1979 data are from *Narkhoz 1979*, pp. 394–395. 1988 data are from *SSSR v tsifrakh v 1989 godu*, pp. 64–65.

NOTE 4. MEASUREMENT ERROR DUE TO THE USE OF INCOME RANGES

To understand the measurement error caused by the requirement that respondents only indicate an income range rather than a specific ruble figure, consider, say, an interval 4 response. This would have been recorded as the response from all sample participants whose perceptions for a particular occupation were in the range of 26–50 rubles/month. Assuming people had an actual specific ruble value in mind — say, 29 rubles or 42 rubles — some information on the distinction between those two responses has been lost. This is usually referred to as an errors-in-variables problem. As is well known, errors in variables in the *independent* variables cause serious problems in regression — both ordinary least squares and maximum likelihood — since the regressors are correlated with the disturbances (see, e.g., BOWDEN and TURKINGTON 1984). However, errors in measuring the dependent variable, as is the case here, cause no problem, since they

are incorporated into the disturbance term. To see this, consider a regression with perceived side income as the dependent variable, a vector of explanatory variables X and a disturbance ε . Suppose the true model were

$$y_i = \beta'X_i + \varepsilon_i \quad [B.7]$$

where the ε_i are distributed $N(0, \sigma_\varepsilon^2)$. But we observe only the mean of a group of the y_i — y . y is related to the original y_i by

$$y_j = y_i + u_i \quad \text{for all } i \text{ in group } j \quad [B.8]$$

where the u_i are distributed $N(0, \sigma_u^2)$. Substituting from Eq. [B.7],

$$y_j = \beta'X_i + \varepsilon_i + u_i \quad [B.9]$$

or

$$y_j = \beta'X_i + v_i \quad [B.10]$$

where $v_i = \varepsilon_i + u_i$.

NOTE 5. MEANS OF VARIABLES

Table B.2. Descriptive Means for the Original Berkeley-Duke Sample,
by Region.
(Standard deviations in parentheses.)

Variable	Region			
	Armenia (N=352)	South (N=243)	Moscow- Leningrad (N=560)	North (N=706)
1 Year of departure	1979.1	1979.2	1979.1	1979.1
2 Last normal year	1977.5	1977.4	1977.1	1977.3
3 Proportion male	0.63 (.48)	0.58 (.50)	0.50 (.50)	0.53 (.50)
4 Years of age at departure	42.9 (13.0)	39.6 (9.3)	47.1 (14.6)	40.1 (10.5)
5 Years of education	10.0 (3.5)	12.5 (2.9)	13.1 (2.6)	11.3 (2.6)
6 Managerial occupation	.04 (.14)	.07 (.26)	.08 (.19)	.08 (.26)
7 Professional occupation	.32 (.45)	.54 (.50)	.61 (.50)	.42 (.49)
8 Clerical occupation	.09 (.23)	.12 (.31)	.12 (.24)	.12 (.32)
9 Operative	.55 (.50)	.27 (.44)	.19 (.33)	.38 (.48)
10 Official earnings (rubles/mo.)	131.0 (81.7)	137.4 (68.3)	110.6 (111.1)	139.8 (75.7)
11 All second ec. inc. (rubles/mo.)	171.2 (229.8)	118.2 (197.8)	39.3 (105.4)	61.1 (169.3)

Table B.3. Descriptive Means for the Follow-Up Berkeley-Duke Sample, Conducted in 1991.
(N=83; standard deviations in parentheses.)

1	Year of departure	1987.7 (1.4)
2	Proportion male	0.63 (.49)
3	Years of age at departure	34.6 (8.4)
4	Years of education	13.8 (2.1)

NOTE 6. MODELING PERCEPTIONS

The issue of how people form beliefs or perceptions about economic events is a topic to which economists have devoted little attention. In the body of this paper, we have avoided the issue by proposing a simple relationship between perceived side income in various occupations and some rather arbitrarily chosen candidates for determinants of those perceptions. This, we suggested, could be regarded as a "reduced form" of a perception function. This note elaborates on that idea.

How does a respondent (a "perceiver") decide on the "average side income" for an occupation? An individual might have direct or indirect experience of actual incomes in that occupation, but it is unlikely that a person's estimate will be based solely on that information. Unless one's experience is very broad it is likely that the perceiver will also consider additional information on what he or she thinks might "adjust" the observed values. To take an extreme case, let us assume you observe one moonlighting car mechanic and he makes 1,000 rubles a month in that activity. Given no other experience, you might be forced to make a judgement about the average car mechanic's side income from that case alone. But consider what happens when you have other information which you believe is relevant to the mechanic's ability to earn money — for instance, that his brother is the local communist party secretary. It is likely that the new information would lead you to conclude that the mean for all car mechanics is somewhat less than the 1,000 rubles you observed....

A somewhat different case may arise when a person has no direct information at all about the actual side income in an occupation but knows a great deal about the occupation otherwise. In the USSR official wages for various occupations are relatively well known. Then, presumably, if — as argued in the second paper in GADDY 1991 — Soviet citizens are guided in their own labor market behavior by a sense of the "wage bundles" and compensating differentials

notion, they will, when asked to estimate side income in an occupation, (1) weigh in their minds the average skills and qualifications which the occupation appears to demand of those who work in it, (2) calculate what such a person "deserves," (3) consider how much the official pay in the occupation is, and (4) compute the difference as the "hidden wage."

In simple fashion, all of these observations about perceptions can be captured by the following derivation of a "perception function." This is based on the idea that perceptions are determined in a two-stage process by (1) the perceiver's access to information, and (2) the perceiver's ability and willingness to use that information.

- (1) Assume a perceiver's information about side income in an occupation is a function of various factors such as geography (which might, e.g., reflect both labor market conditions and the local customs and attitudes that influence second economy activity) and the personal characteristics of the perceiver, in particular those characteristics that might tend to mean that the perceiver obtains more direct or indirect experience of the occupation. (In practice, these latter personal characteristics of the perceiver might be the same as the characteristics of those people who work in the occupation and determine their side incomes.) Assume this "information function" is of the form

$$I_{ij} = f(X_i, B_j) \quad [B.11]$$

for the information, I_{ij} , about occupation j available to individual i . X_i is a vector of characteristics of individual i and B_j a coefficient vector conformable with X_i .

- (2) Assume that people differ in the way they use information. To illustrate: assume two individuals observe the same occupation and acquire the same information about it. But when asked for the mean [expected value] of side income in that occupation, their responses will depend not only on that common information — the "facts" — but also on how much of that information each is able and willing to use. In other words, the information will be filtered through their own perceptions.

Assume, therefore, that a person's perception can be modeled as a function of his or her personal characteristics and information set. Let P_{ij} be respondent i 's assessment of mean side income in occupation j . P_{ij} can then be expressed:

$$P_{ij} = g(I_{ij}, Y_i, A_j) \quad [B.12]$$

or

$$P_{ij} = g(f(X_i, B_j), Y_i, A_j) \quad [B.13]$$

where Y_i is a vector (possibly overlapping with X_i) of characteristics of respondent i which influence his or her perception of side earnings, A_j is a coefficient vector which belongs with Y_i , and $g(\cdot)$ is a "perception function."

The type of reduced-form regression equation used in Section 4 is thus a combination of Eqs. [B.12] and [B.14] into:

$$P_{ij} = \phi(X_i, Y_i, C) \quad [B.14]$$

where C is composed of B and A .

NOTE 7. VOLUNTEERED RESPONSES

In addition to the 36 listed occupations, and to the questions relating to the respondents' own occupations and branches, Part B of the Berkeley-Duke survey also asked respondents to suggest up to five additional occupations on their own (see Appendix A). When asked to list other occupations which "afford good opportunities for various types of additional earnings," the survey's respondents volunteered a total of well over 4,000 write-ins, mentioning more than 250 different occupations. As it turns out, however, only 16 were volunteered as many as 75 times. Table B.4 lists those 16 occupations, the number of times they were volunteered, the number of times they were listed first, and the modal response for each (measured both in the original 1-8 intervals and in rubles/month).

Table B.4. The 16 Most Frequently Volunteered Occupations and Their Perceived Side Incomes.

Code	Name	No. of times volunteered ^a	No. of times listed first	Modal response (ints. 1-8) ^b	Modal response (rubles/mo.) ^c
1 403	Tailors, seamstresses	333	111	7	250
2 382	Barbers, hairdressers	329	140	5	75
3 462	Traffic police (GAI)	134	38	8	362.5
4 192	Furriers	128	22	7	250
5 078	Jewellers	125	30	9	512.5
6 562	Doctors ^d	125	57	8	362.5
7 365	Waiters	105	31	5	75
8 651	Retail managers ^d	95	35	8	362.5
9 402	Auto repairmen	95	31	8	362.5
10 460	Police	94	27	8	362.5
11 583	University administrators	89	38	8	362.5
12 465	Customs officials	86	49	10	700
13 461	OVKhSS	85	20	10	700
14 407	Shoemakers	83	14	5	75
15 259	House painters	76	27	5	75
16 701	Municipal services mgrs.	75	29	8	362.5

NOTES:

^a Since the occupation codes used in the survey span several individual occupations, some occupations appear to have been volunteered more than once by the same person. E.g., the same respondent might have volunteered both "barber" and "hairdresser." However, both those occupations have the same same code — code 382. In this computation, this would be counted as two separate responses.

^b The mode is the response category which is most frequently stated. The following crude procedure was used to deal with censoring: when the frequency of category 8 responses was approximately twice that of the sum of categories 5-7, the mode was deemed to be 9 rather than 8. If category 8 responses were three times as high as the sum of categories 5-7, then the mode was deemed to be 10.

^c The procedure for converting intervals 1-10 to ruble values is described in note 2 in Appendix B.

^d Doctors and retail managers were both included in the original list of 36 occupations.

The main problem here is how to interpret these responses. In the rest of this paper we essentially chose to focus on finding the average opinion, the consensus. If we were to try and follow that approach in the case of the volunteered information, we would encounter major difficulties. The people who volunteer are a small minority who have self-selected themselves. In principle, there are ways of using information about the people who volunteered to construct an "average" opinion, and below we suggest such an approach. It is questionable, however, whether this very cumbersome technique would provide enough valid information to be worth the effort. Moreover, it might be argued that those who volunteer have

better information than the average person, and if we are interested in the objective truth rather than subjective perceptions, we would be better off looking only at the volunteers. If this is true, it may be better to take the volunteered responses on their own terms.

A SELECTIVITY MODEL FOR VOLUNTEERING A RESPONSE

There is a serious selection bias in the case of the volunteered responses. The selection criteria were both explicit and implicit: respondents had to think of occupations meeting the requirement that the volunteered occupations offer good opportunities for side income (i.e., the respondents had to have information about the occupations), and they had to be willing to list them. This means that what we observe is the result of a three-dimensional selection process: (1) the respondent's ability to answer (i.e., his or her information about occupations); (2) the respondent's willingness to answer; and (3) the truncation of answers dictated by the requirement that respondents were to suggest only occupations which offered "good opportunities" for side earnings.

To grasp the selectivity problem involved, it may be easier to imagine what total absence of selectivity bias would have looked like. Two things would be required: first, the people who had information about a given occupation and who were willing to use that information could not in any relevant way differ from the overall sample ("relevant" meaning in a way that affected their answers), and second, a firm cut-off point (some specific ruble value) would have to be set for the truncation of responses.

As it is, however, the volunteers' answers are doubly-censored: on the right at the 300+ threshold as before, and on the left at some individually-determined lower threshold below which an individual doesn't deem it worthwhile to volunteer an answer. In the terminology of MADDALA [1984, p. 174 (Eq. 6.11)], this is a "censored regression model with an unobserved stochastic threshold."

The standard example of this is labor supply:

$$y_1 = \beta_1'X_1 + u_1 \quad [B.15]$$

y_1 is the official market wage and y_2 is the individual's reservation wage. If $y_1 > y_2$ we observe the individual in the labor force; if $y_1 < y_2$, we observe the individual not in the labor force and do not observe y_1 . We never observe y_2 .

To repeat, y_1 is observed only if $y_1 \geq y_2$, where y_2 is unobserved and stochastic. However, we do observe variables which determine y_2 , i.e.

$$y_2 = \beta_2'X_2 + u_2 \quad [B.16]$$

So in the case at hand, y_{Iji} is the volunteered response by individual i for occupation j — i.e., how much side income individual i thinks people in occupation j make on average. y_{2i} is the individual-specific threshold for “good opportunities” for side income. Thus, if $y_{Iji} > y_{2i}$ for individual i for occupation j , he or she will volunteer a response for that occupation and we will observe y_{Iji} . If $y_{Iji} < y_{2i}$, he will not volunteer a response and we observe nothing. Note that we never directly observe y_{2i} , the threshold for whether or not a person volunteers.

To continue the labor supply analogy, let us model a person’s perception of side income in occupation j as:

$$y_{Iji} = \beta_{1j}' X_{Iji} + u_{Iji} \quad [B.17]$$

Model a person’s threshold for “good opportunities” for side income as:

$$y_{2i} = \beta_2' X_{2i} + u_{2i} \quad [B.18]$$

This is a model of self-selection since the sample partitions itself into volunteers and non-volunteers based on the relationship between y_{Ij} and y_2 , that is, between the perceived side income for occupation j and the threshold y_2 , which is assumed to be common to all occupations I, \dots, j .

This, then, in Maddala’s terminology, is a “doubly censored regression model with an observed deterministic upper threshold and an unobserved stochastic lower threshold.” The deterministic upper threshold is the same 300+ rubles/month as before. The unobserved stochastic lower threshold is what distinguishes the question on volunteered occupations from the other questions: not everyone has the same definition of “good” opportunities for side income. For one person, “good” opportunities might mean 100 rubles a month; for another, the limit might be 500 a month. But in any case, it is not hard to see that the average response from the volunteers will be systematically higher than the average response we would have obtained if we had asked all 1,861 sample members to give an estimate for the same occupations as those listed by the volunteers.

How might this problem be tackled? The labor supply analogy suggested above offers the obvious answer: we would need to estimate a “participation equation” for volunteering a response, and then proceed with the type of selectivity bias correction suggested by Heckman [1979]. Among the candidate variables for such a participation equation would be all the obvious demographic variables, as well as some measure of an individual’s pattern of responses to the original 36 occupations. (The latter measure would be designed to capture the individual-specific tendency to estimate high or low compared to the mean respondent even after controlling for the demographic factors.) With the inverse Mill’s ratio obtained from such an equation, one could then proceed to “predict” a response from the non-volunteers.

In principle, then, it is possible to adjust the volunteered responses to approximate the response that would have been given by average sample member . In practice, the cumbersome nature of this procedure, combined with severely censored data (a large proportion of "Over 300" responses), make it unworkable.

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